HP Tower Server tc4100
Operations and Maintenance Guide

invent

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Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots LAN servers. Hewlett-Packard Company assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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1 Control and Indicators

Front Panel Control and Indicators

This chapter describes the controls, ports and indicators on the front and rear of the HP Server tc4100. *Figure 1-1*, *Figure 1-2*, *Figure 1-3*, and *Figure 1-4* below show the HP Server tc4100 as pedestal and rack models.

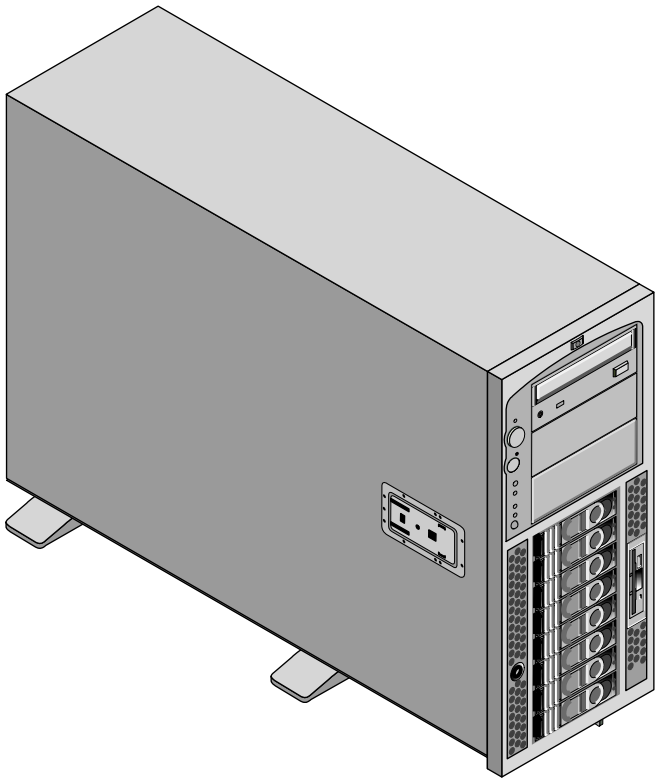


Figure 1-1. HP Server tc4100 Pedestal (front view)

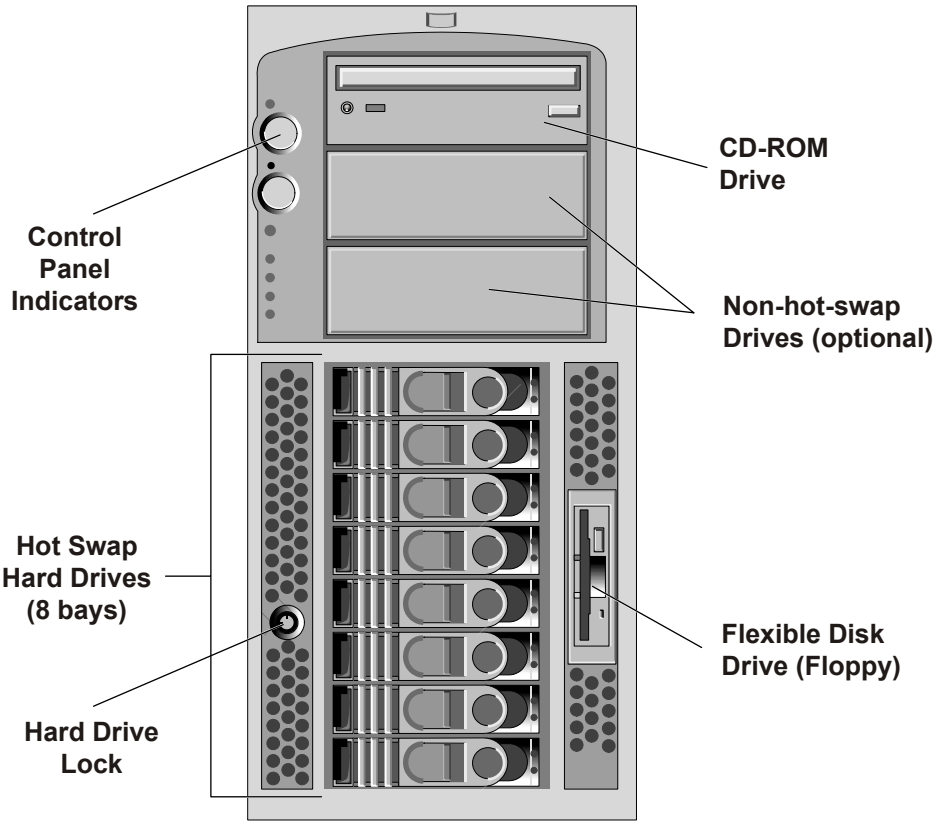


Figure 1-2. HP Server tc4100 Pedestal Bezel

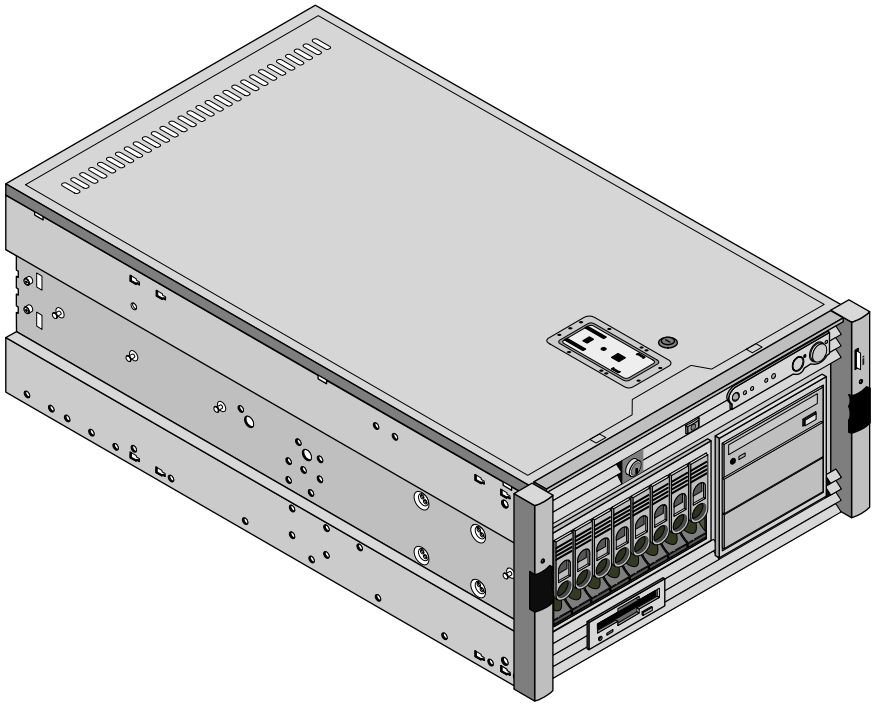


Figure 1-3. HP Server tc4100 Rack (front view)

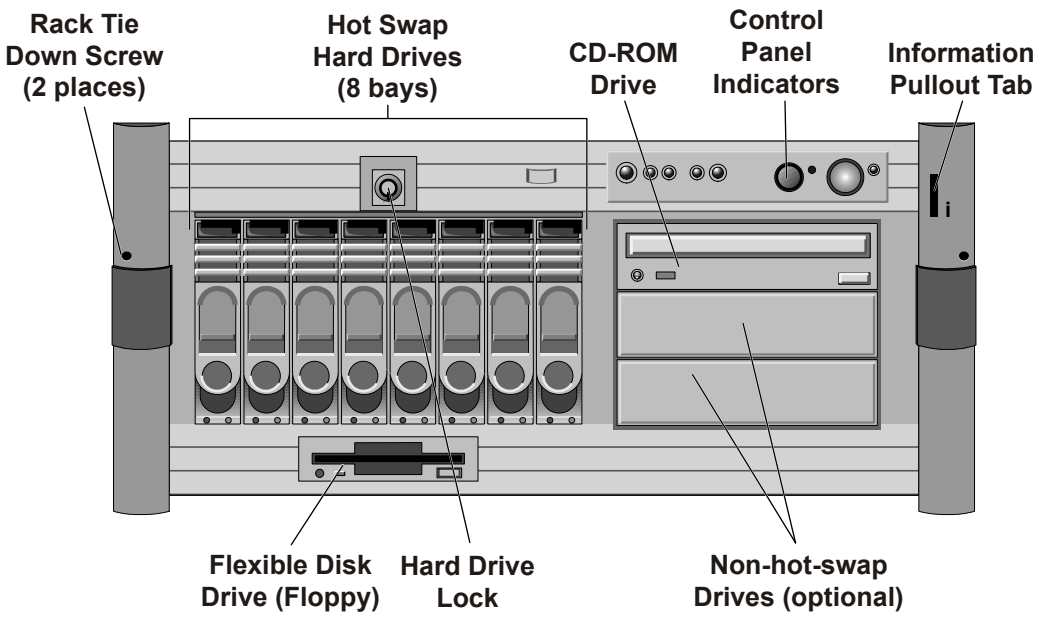


Figure 1-4. HP Server tc4100 Rack Bezel

NOTE	If the HP Server Remote Management Card accessory is installed, certain LEDs will function differently. The table below describes the LED functionality with and without the HP Server Remote Management Card accessory.

Power, Reset, and Keyboard Lock Buttons

The control buttons shown in *Figure 1-5* are described in *Table 1-1*.

Table 1-1. Power, Reset, and Keyboard Lock Buttons and LEDs

Control/LED	Description
Power On/Off/ Sleep Button	This button turns the HP Server tc4100 power On or Off, and if available, also transitions the Server between Power On and sleep states. If sleep states are not available, then this button only turns power On or Off. The sleep states are NOS dependent. If your NOS does not support power management based on the ACPI (Advanced Configuration and Power Interface) standard, the sleep states are not available. Refer to *"Applying Power to the HP Server tc4100" on page 14*.
Power On/Off/ Sleep LED	The Power On/Off/Sleep LED has three distinctive states: • Blank: No Power • Green: Power on • Green Flashing: Sleep mode
Reset Button	Performs a system (hard) reset.
Keyboard Lock LED	The Keyboard Lock LED has two distinctive states when the server is set to "Network Server Mode" through the BIOS setup program: • Blank: Keyboard lock is not engaged • Green: Keyboard lock is engaged
Locator Button/ LEDs	There are two Locator Buttons: one on the front panel (behind the bezel) and the other one on the back of the unit (used for a rack configuration). Pressing one of the buttons toggles the LEDs in synchronous both at the front and the end of the unit. The Locator LED has two states: • Dark indicates that the locator feature is not active • Solid Blue indicates that the locator feature has been activated by the front switch, rear switch or software utility

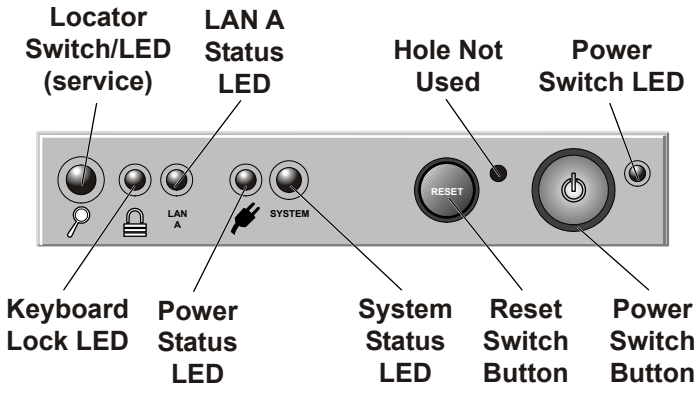


Figure 1-5. Drive LED Indicators

Front Panel LED Indicators

Table 1-2. Component Indicators

Power Supply Status LED	**NOTE:** The installation of the HP Server Remote Management Card (optional accessory) changes this LED behavior. If the HP Server Remote Management Card is installed, this LED displays: • Green (Steady): Normal operation. If two power supplies are installed, it indicates redundancy. • Red (blinking at 2 Hz blink rate): A subsystem has a critical problem preventing the server from powering on. • Amber (blinking 1 Hz blink rate): The power subsystem has lost redundancy since the last boot, or a fan has failed in a power supply. Please see LED's on power supplies for further diagnosis (See Power Supply Indicator) If the HP Server Remote Management Card is not installed, the LED behavior observes the following changes: • It does not indicate Predictive Failure; it only indicates the "good" and "failed" states. • It does not blink; it stays lit. • There can be up to a 1-minute delay between the occurrence of an error condition and the corresponding LED indication. • There can be up to a 1-minute delay between the fixing of an error condition and the corresponding LED indication.
System Status LED	**NOTE:** The installation of the HP Server Remote Management Card (optional accessory) changes this LED behavior. If the HP Server Remote Management Card is installed, this LED displays: • Green (steady): All components are OK • Yellow (blinking at a rate of 1 Hz): An internal component may fail soon (i.e. system fan speed below threshold, predictive memory fail). Check the internal diagnostic board or the system event log. • Red (blinking at a rate of 2 Hz): An internal electrical component has failed or there is a CPU or DIMM configuration error that prevents the system from booting. Check the internal diagnostic board or the system event log. If the HP Server Remote Management Card is not installed, the LED behavior observes the following changes: • It indicates the current states of the system fans. If the light is green, the fans are ok. If the light is red, a fan has failed. • It does not blink; it stays lit. • There can be up to a 1-minute delay between the occurrence of an error condition and the corresponding LED indication. • There can be up to a 1-minute delay between the fixing of an error condition and the corresponding LED indication.
LAN A LED	The LAN A LED has three distinctive states: • Blank: No LAN link has been established • Green (steady): A LAN link has been established • Green (flashing): There is LAN activity

Internal Diagnostic Panel (Optional Accessory)

NOTE	The internal diagnostic panel is included in the optional remote management card accessory.

The Internal Diagnostic Panel LEDs are located inside the server under the top cover (rack) or left cover (pedestal). The LEDs have the following behaviors:

- OFF: The component is OK or there is no component.
- ON (color amber): The component needs attention (failure, pre-failure, early-warning condition, configuration error, etc.). Whenever an LED turns on, the HP Server tc4100 notifies you by turning the System LED (located in the front panel) to amber or red.
- LEDs are powered as long as AC is present (Vstby). They do NOT turn off when the server is powered off.
- LEDs reflecting actual sensors should turn OFF when the sensors return to normal. Note that a system reset always returns sensors to normal. If the error condition is still present when the system comes back up, the sensor should go back to the error state within one minute.

Some LEDs are triggered by SEL events (for example, DIMM configuration error) and will only be cleared by a system reset. After resetting, the LED should be cleared until a new SEL event is logged. These LEDs should stay lit even if the server is turned off.

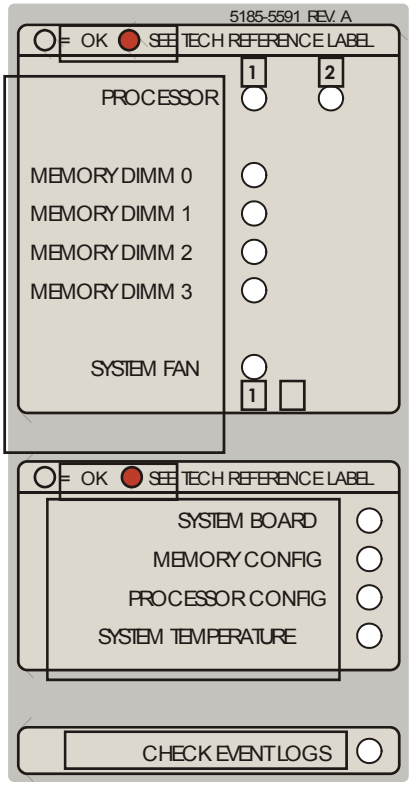


Figure 1-6. Visual Diagnostic Label

Table 1-3 describes how to troubleshoot and solve issues using the Internal Diagnostic Panel

Table 1-3. Using the Internal Diagnostic Panel

LED Name	Error Conditions	Corrective Action
Processor	Temperature over threshold, Internal CPU Error	1. Check the system event log to view error details. If CPU is over the temperature threshold, verify that the heat sink and thermal grease are installed properly--call HP Customer Care. Also check items in the System Temperature section below. 2. If errors are not resolved, try rebooting the server to resolve the error.
Memory DIMM	ECC double and single bit errors	1. Check the system event log to view error details. If the error is a predictive failure, you may continue to operate the Server, however, the DIMM should be replaced as soon as possible to avoid unscheduled downtime. If the error is a double-bit uncorrectable error, the DIMM should be replaced immediately. 2. If other errors occur, power down the server, unplug the server from its power source, re-seat the DIMM, and restart the HP Server tc4100.
System Fan	Incorrect fan speed, predictive fan failure, fan failure	1. Reseat system fan module. 2. If the error is not resolved, replace the system fans.
System Board	System board voltage level error	Reboot the HP Server tc4100.
Memory Configuration	Incorrect memory type	Check that the installed memory is HP PC133 ECC SDRAM memory. If this is not correct, replace all DIMMs that are not HP PC133 ECC SDRAM memory.
Processor Configuration	Incompatible Stepping	Check the stepping of the processors. Replace any processors that do not have compatible steppings.
System Temperature	Temperature over threshold	Check the following: • All system fans are operational • CPU heat sink is installed correctly on processor with thermal grease--call HP Customer Care. • Room temperature within supported temperature range. See Chapter 9 for Environmental Requirements. • All covers, filler panels and air ducts are installed correctly. • Adequate ventilation • Check system event log for further details If none of the above steps resolves the problem, reboot HP Server tc4100.
Check Event Log	Many errors	Check the system event log to view error conditions.

The system event log can be accessed from:

- Instant Toptools
- Toptools
- Navigator CD
- Diagtools

Hot Swap Disk Drive Indicators

Each of the Hot Swap hard disk drives has two LED indicators, one for operational status and one for activity status. Light pipes on each drive module transmit light to the front from the LEDs on the inside rear of the hot-swap mass storage cage. See *Figure 1-5* and *Table 1-4*.

Table 1-4. Hot Swap Hard Disk Drive LED Indications

Status LED	Activity Status LED
Off: Disk not present, or not connected to the cage	**Off**: No disk activity
Green (solid): Disk present	**Green (flashing)**: Accessing disk
Amber (flashing): Disk failure predicted	**Green (solid** for more than one minute**)**: Disk spinning up, or "hung"
Amber (Solid): Disk failed	
Amber (Solid on all drives): Missing SCSI jumper cable OR SCSI Management Board	

Non-Hot Swap Disk Drive Indicators

For more information on the HP Tape Drive and its error codes, refer to the documentation provided with the tape drive or to Hewlett-Packard's web site, at:

http://www.hp.com

See also the *"Mass Storage Devices" on page 29*.

Rear Panel Indicators and Ports

The HP Server tc4100 rear panel includes communication ports, the AC power inlets, and the Server power supplies.

Figure 1-7 shows the HP Server tc4100s rear panel.

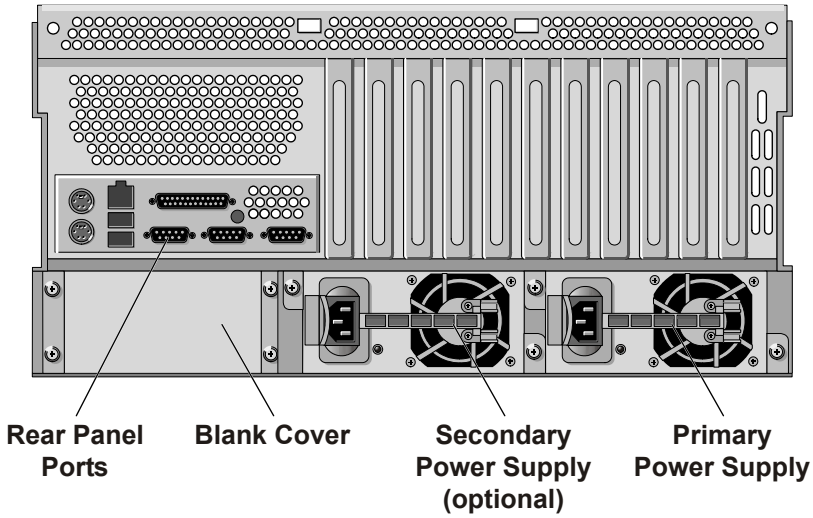


Figure 1-7. HP Server tc4100 Rear Panel

CAUTION	To prevent a power supply from overheating, ensure that the other power supply opening remains covered, if a second supply is not used. If the second supply is used, keep the cover in case you need to remove one supply for repair.

Power Supply Indicator

Each HP Server tc4100 Power Supply has an indicator as shown in *Figure 1-8*, and each power supply has its own power cord connection. The HP Server tc4100 comes with one Power Supply (standard); a second Power Supply for redundancy is optional.

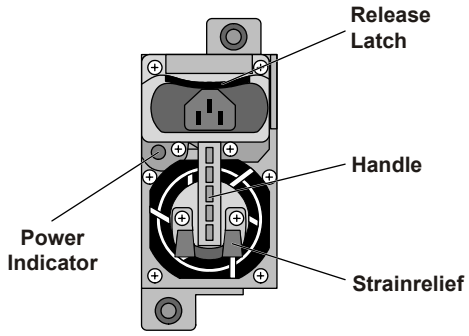


Figure 1-8. Power Supply LED

NOTE The release latch, which is spring loaded, must be up to insert the power cord. The power supply cannot be removed from the chassis with the power cord connected to the AC In connector. The power cord must be removed before pushing down on the release latch to free the power supply from the chassis.

Table 1-5. Power Supply LED Indicator Descriptions

Green LED	Power Supply and Server Status
Steady Green	This indicates that the output voltages are present. It does not indicate the status of the HP Server tc4100 software.
Off	This indicates the Server is powered off, the AC line cord is unplugged, or the power supply has failed, which may include a fan failure (turning too slowly). If a fan fails in one of two supplies, the defective supply will continue to operate until it reaches the thermal shutdown limit. The second power supply (redundant power supply) will continue to operate providing the necessary power. Refer to *Chapter 6, Troubleshooting*.

Communication Ports

The connectors on the HP Server tc4100's rear panel are shown in *Figure 1-9* and described below.

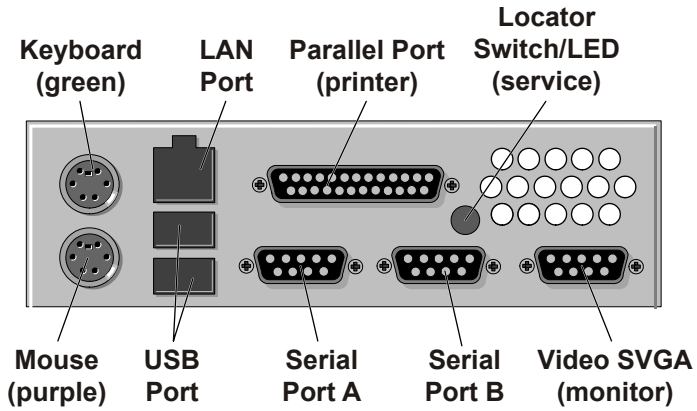


Figure 1-9. Rear Panel Ports

- Keyboard - This port accepts a standard keyboard with a PS/2 connector.
- LAN -This port is an embedded controller that has an RJ-45 LAN connector.
- USB - This port is provided for printers, scanners, and external modems.
- Serial A – This is a standard serial port connector.
- Serial B – This is a standard serial port connector.
- Parallel – This is the standard parallel printer port connection.
- Mouse – This connector accepts a standard PS/2 mouse.
- Video SVGA – This connector provides the video signal to drive the Server's monitor. Refer to *"Video Display Modes" on page 122*.

NIC Indicators

The embedded NIC (Network Interface Card) has two LEDs associated with it, which can only be seen from the rear of the HP Server tc4100. See *Table 1-6*.

Table 1-6. NIC LED Code

Indicator	Definition
Link/Activity LED	This LED turns solid green to indicate that it is linked and properly connected.
	The green LED blinks to indicate the embedded NIC (network adapter) is active and transferring data to/from the NIC. The rate of blinking varies directly with network traffic.
10/100 Mbps LED	This yellow LED turns on to indicate when the NIC is supporting transfers of 100 Mbps (million bits per second). When it is off, the NIC is supporting transfers of 10 Mbps.

Applying Power to the HP Server tc4100

Powering Up the HP Server tc4100

1. Ensure that the HP Server tc4100's power cord or power cords are connected to the power source. See *Figure 1-8*.
2. Press the Power button on the front control panel. See *Figure 1-5*.

NOTE Each time AC power is applied (power cord is plugged in), there is a 15 second delay (self test) before the front control panel will respond to your actions.

Powering Down the HP Server tc4100

1. Log off all users and, if necessary, back-up files. Follow instructions in your network operating system (NOS) documentation to gracefully shut down all networking software and applications.
2. Press the power switch on the HP Server tc4100 control panel when prompted by the operating system.
3. Normally, this completes the shutdown procedure.

NOTE The power supply will continue to provide standby voltage to the HP Server tc4100 until the power cord(s) is/are disconnected.

Connecting AC Power to Multiple-Server Configurations

The HP Server tc4100 temporarily draws a large “inrush current,” when first connected to an AC power source. When the AC Power is turned off, inrush does not occur. However, in “standby mode” the AC power stays on and the DC power is turned off.

Initially, the inrush current is much greater than the Server's normal operating current and, generally, the AC power source can handle this normal inrush current. However, if you install several HP Servers on one circuit, precautions are necessary. If there is a power failure and power is then restored, all the servers immediately begin to draw inrush current at the same time. If the circuit breakers on the incoming power line have insufficient capability, the breaker may trip and thus prevent the servers from powering up.

When preparing your site for installation, allow for the additional inrush current. See *“Power Specification” on page 124*.

Sleep States (ACPI)

The HP Server tc4100 supports the ACPI (Advanced Configuration and Power Interface) standard, which is a key component of a NOS's directed power management. The supported features are only available when an ACPI-compliant NOS is installed on the Server. The term “sleep state” refers to any of several reduced power consumption states in which normal NOS activity has ceased.

The Server supports several sleep states, including a sleep state with a short wake-up time, sometimes referred to as “standby” or “suspend” by various operating systems. In this sleep state the Server appears to be off, and is indicated by no display on the monitor and no activity for the CD-ROM or internal hard drives. However, the power LED is slowly flashing and the fans continue to operate.

The HP Server has another sleep state with a slower wake-up time, sometimes referred to as “hibernate” by various operating systems. In this sleep state, the server appears to be off as described earlier, but the fans and the front panel power LED are also turned off. The unique feature of this sleep state (and the reason for its slower wake-up time) is that information about the server's NOS state (open applications, screens, and so on) is saved to disk before the server is placed in the sleep state. Upon wake-up, this information must be restored from the disk. This method of restoring the server's operation is much faster than a complete rebooting of the server. It still requires running all the start-up self-tests before starting the NOS, but loading the NOS and all the previously opened applications is much faster.

The HP Server supports certain types of system activity, which is used as wake-up events from these sleep states. These wake-up events can be generated from the power button, LAN activity, and scheduled events.

NOTE The HP Server’s power management policies (transitions between various power states) and the user options are specific to the particular ACPI-compliant NOS installed on the server. If your NOS is ACPI-compliant, refer to the power management features in the instructions provided for more information.

The HP Server’s power button can be configured to initiate a graceful shutdown of the NOS rather than an immediate shutdown of the power supply. The power button configurations are dependent on the user interface provided by the ACPI-compliant NOS. While power management is under the control of the ACPI-compliant NOS, the HP Server’s power button is capable of an override in case of a non-responsive NOS.

NOTE The HP Server power button will force a power-down without waiting for the NOS to gracefully shut down the server, if the power button is pressed and held more than four seconds.

CAUTION If the power button override is used, there is a strong possibility that data will be corrupted or lost.

2 External Connectors

Unless otherwise noted, the following features apply to all models. Some features are factory installed; others are optional.

Mini-DIN (PS/2) for Mouse and Keyboard

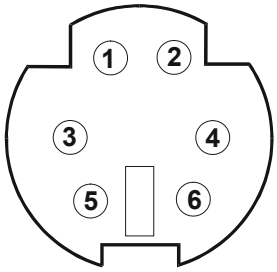


Table 2-1. Mini-DN Signal Description

Pin Number	Signal Description
1	Data signal
2	Not used
3	Ground
4	Power (+5 V dc)
5	Clock signal
6	Not used

Serial Port

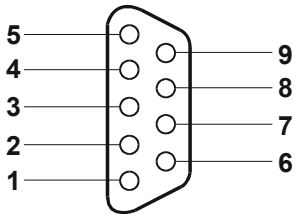


Table 2-2. Serial Port Signal Description

Pin Number	Signal Description
1	Data carrier detect
2	Receive data
3	Transmit data
4	Data term ready
5	Signal ground
6	Data set ready
7	Request to send

Table 2-2. Serial Port Signal Description

Pin Number	Signal Description
8	Clear to send
9	Ring indicator

Parallel Port

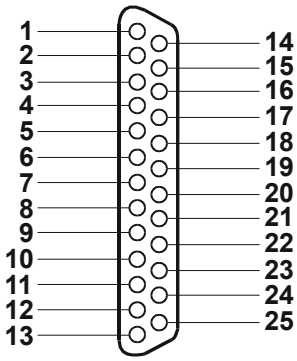


Table 2-3. Parallel Port Signal Description

Pin Number	Signal Description	Pin Number	Signal Description
1	Strobe5	10	Acknowledge[b]
2	Data bit 06	11	Busy
3	Data bit 1[a]	12	Paper end
4	Data bit 2[a]	13	Select
5	Data bit 3[a]	14	Auto line feed[b]
6	Data bit 4[a]	15	Error1
7	Data bit 5[a]	16	Initialize printer[b]
8	Data bit 6[a]	17	Select in[b]
9	Data bit 7[a]	18-25	Signal ground

a. All data bits are sent to a printer in an 8-bit parallel format.

b. The signal is active low.

USB

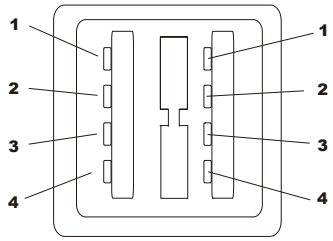


Table 2-4. USB Signal Description

Pin Number	Signal Description
1	VBUS
2	D+
3	D-
4	GND

NOTE Use of the USB port is supported for printers, scanners, and external modems.

Standard Video

The built-in video uses the standard 15-pin analog display pinout configuration. The pinouts for your monitor may vary. For the pinouts for your monitor, refer to the manual provided with your monitor.

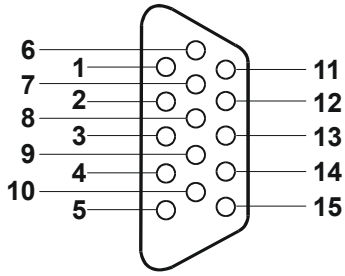


Table 2-5. Standard VIdeo Pin Functions

Pin Number	Function	Pin Number	Function
1	Red	9	Key (no pin)
2	Green	10	Sync return (ground)
3	Blue	11	Monitor ID bit 0
4	Monitor ID bit 2	12	Monitor ID bit 1
5	Monitor self test (ground)	13	Horizontal sync (+)
6	Red return (ground)	14	Vertical sync (-)
7	Green return (ground)	15	Not used
8	Blue return (ground)		

Standard SCSI

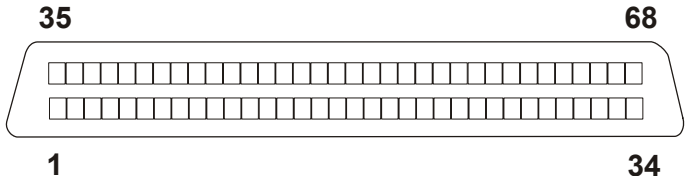


Table 2-6. SCSI Pin Signals

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	S1 (+DB 12)	18	S18 (TERMPWR)	35	S35 (-DB 12)	52	S52 (TERMPWR)
2	S2 (-DB 13)	19	S19 (RESERVED)	36	S36 (-DB 13)	53	S53 (RESERVED)
3	S3 (+DB 14)	20	S20	37	S37 (-DB 14)	54	S54
4	S4 (+DB 15)	21	S21 (+ATN)	38	S38 (-DB 15)	55	S55 (-ATN)
5	S5 (+DB P1)	22	S22	39	S39 (-DB P1)	56	S56
6	S6 (+DB 0)	23	S23 (+BSY)	40	S40 (-DB 0)	57	S57 (-BSY)
7	S7 (+DB 1)	24	S24 (+ACK)	41	S41 (-DB 1)	58	S58 (-ACK)
8	S8 (+DB 2)	25	S25 (+RST)	42	S42 (-DB 2)	59	S59 (-RST)
9	S9 (DB 3)	26	S26 (+MSG)	43	S43 (-DB 3)	60	S60 (-MSG)
10	S10 (+DB 4)	27	S27 (+SEL)	44	S44 (-DB 4)	61	S61 (-SEL)
11	S11 (+DB 5)	28	S28 (+C/D)	45	S45 (-DB 5)	62	S62 (-C/D)
12	S12 (+DB 6)	29	S29 (+REQ)	46	S46 (-DB 6)	63	S63 (-REQ)
13	S13 (+DB 7)	30	S30 (+I/O)	47	S47 (-DB 7)	64	S64 (-I/O)
14	S14 (+DB P)	31	S31 (+DB 8)	48	S48 (-DB P)	65	S65 (-DB 8)
15	S15	32	S32 (+DB 9)	49	S49	66	S66 (-DB 9)
16	S16 (DIFFSENS)	33	S33 (DB 10)	50	S50	67	S67 (-DB 10)
17	S17 (TERMPWR)	34	S34 (DB 11)	51	S51 (TERMPWR)	68	S68 (-DB 11)

Standard LAN

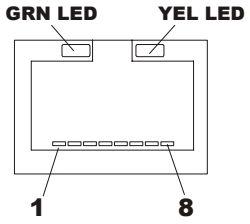


Table 2-7. LAN Signal Description

Pin Number	Signal Description
1	Data signal
2	Not used
3	Ground
4	Power (+5 V dc)
5	Clock signal
6-8	Not used

3 Installing and Configuring

Opening and Closing the HP Server tc4100

Introduction

This section describes how to safely extend the rack-mounted HP Server tc4100 out of the rack and how to remove and replace the covers from the HP Server tc4100 either rack-mounted or in the pedestal. This section also describes how to remove and replace the pedestal base from the HP Server tc4100.

WARNING	Before removing the covers, shut down the operating system and disconnect the power cords and unplug telephone cables. Disconnect the power cords to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects, such as tools or jewelry. Disconnect telephone cables to avoid exposure to a shock hazard from telephone ringing voltages.

Tools Required

Antistatic service kit (3M™ 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Removing the HP Server tc4100's Covers

The HP Server tc4100's covers are designated top and bottom for the rack-mounted version and left and right for the pedestal version.

Removing Covers – Rack-Mount

Use this procedure to remove the bezel and then safely extend the Server to where you can remove the covers (top and bottom) from the HP Server tc4100.

- If you are installing hardware options, you must remove the front bezel, extend the Server, and remove the top cover. The hardware options include not-hot swap drives, common-tray drives, accessory boards, DIMMs, and an additional processor, which require access to the interior of the Server.
- If you are only installing or removing hot-swap SCSI disk drives, remove the bezel, but do not extend the Server or remove the covers.
- If you are only installing the redundant power supply, you do not need to remove the bezel, extend the Server or remove the covers.

WARNING	To prevent injury or system damage, do not operate the HP Server tc4100 with its covers or front bezel removed, or install items with the power cord connected. Always disconnect the power cord before removing any covers, to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry. Disconnect any telephone cables to avoid exposure to shock hazard from telephone ringing voltages.

CAUTION	To prevent overheating, never operate the Server with its covers removed. This includes the power supplies and Hot Swap hard disks, which must be replaced or the opening covered immediately (within 2 minutes).

1. If the HP Server tc4100 is operating, log off all users and, if necessary, back up files.
2. Follow instructions in your network operating system (NOS) documentation to gracefully shut down all networking software and applications.
3. Press the power switch on the HP Server tc4100 control panel when prompted by the operating system.

   Normally, this completes the power down procedure.
4. Disconnect the power cord or cords from the power source.

NOTE	The power supplies will continue to provide standby current to the Server until the power cords are unplugged

5. At the front of the HP Server tc4100, extend the anti-tip foot from under the front of the rack.

WARNING	This anti-tip device must be extended to prevent the rack and HP Server tc4100 from tipping over and getting damaged.

6. Unscrew the slide securing screw (2) on each bracket securing the chassis to the column adapter on each side of the rack.
7. Press in on each blue Slide Release button (2) with both hands to slide the HP Server tc4100 out of the rack.
8. Pull the Server out of the rack until it snaps into the safety locks in each slide with a click.

CAUTION	To prevent damage to the covers, support the cover as you remove it from the HP Server tc4100. The Server's covers are heavy.

9. To remove the top cover, pull the latch up and lift the top cover away from the server. See *Figure 3-1*.

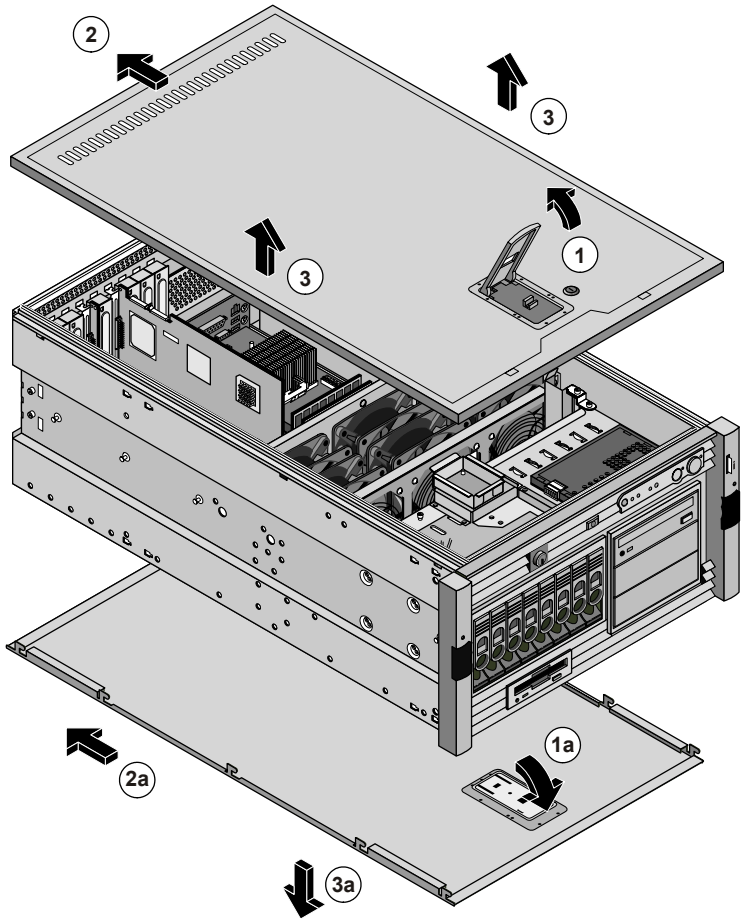
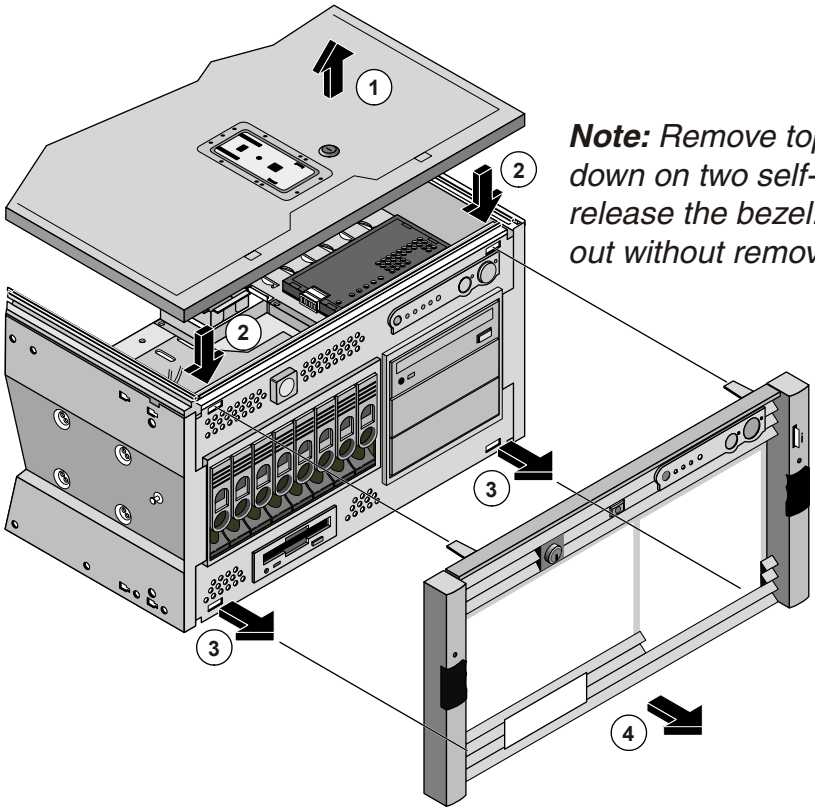


Figure 3-1. Removing HP Server tc4100 Covers

10. To remove the front bezel, press down on the two self-locking tabs as shown in Figure.

11. Press down on the two self-locking tabs as shown in *Figure 3-3* to release the bezel from the chassis.



Note: *Remove top cover and press down on two self-locking tabs to release the bezel. Bottom tabs will slide out without removing the bottom cover.*

Figure 3-2. Removing the HP Server tc4100's Bezel

12. Pull the bezel away from the front of the HP Server tc4100.

WARNING	Do not operate the HP Server tc4100 with the bezel removed due to the possibility of damaging the system with Electrostatic Discharge (ESD) or with foreign objects shorting out exposed electronic circuits.

13. If necessary, remove the bottom cover by lifting the plastic latch and pulling it forward. See *Figure 3-1*.

    The bottom cover only provides access to the Power Distribution Board and Floppy Disk Drive.

14. Support the bottom cover with your free hand, as you pull the cover forward to disengage it, catching it as it falls away from the chassis.
15. To replace the top cover, position the cover's tabs over the respective holes along the top edge on both sides of the chassis.
16. Slide the cover toward the rear.
17. Close the plastic latch.
18. To replace the bottom cover, position the cover's tabs under the respective holes along the bottom edge on both sides of the chassis.
19. Slide the cover toward the rear.
20. Close the plastic latch.
21. Release the safety latches in the slide members on both sides of the chassis.
22. Slide the HP Server tc4100 into the rack.

23. To replace the front bezel, line up the 4 tabs into the slots in the chassis. You can then snap the bezel into place.
24. If the Server is not in a restricted-access area, tighten both slide securing screws.
25. Return the HP Server tc4100 to normal operation.

Removing Covers – Pedestal

Use this procedure to remove the bezel and covers (left & right) on the pedestal version of the HP Server tc4100.

- If you are installing hardware options, you must remove the front bezel and top cover. The hardware options include accessory boards, DIMMs, and an additional processor.
- If you are only installing or removing SCSI disk drives, remove the bezel, but do not extend the Server or remove the covers.

WARNING	Do not operate the HP Server tc4100 with its covers removed. Always disconnect the power cord before removing any covers, to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry. Disconnect any telephone cables to avoid exposure to shock hazard from telephone ringing voltages.

CAUTION	To prevent overheating, never operate the Server with its covers removed. This includes the power supplies and Hot Swap hard disks, which must be replaced or the opening covered immediately (within 2 minutes).

1. If the HP Server tc4100 is operating, log off all users and, if necessary, back up files.
2. Follow instructions in your network operating system (NOS) documentation to gracefully shut down all networking software and applications.
3. Press the power switch on the HP Server tc4100's control panel when prompted by the operating system. Normally, this completes the power-down procedure.
4. Disconnect the power cord(s) from its power source.

5. To remove the bezel, first remove the left cover by pulling the plastic latch out. Then press down the two self-locking tabs to release the bezel. The right tabs slide out without removing the right cover. See *Figure 3-3*.

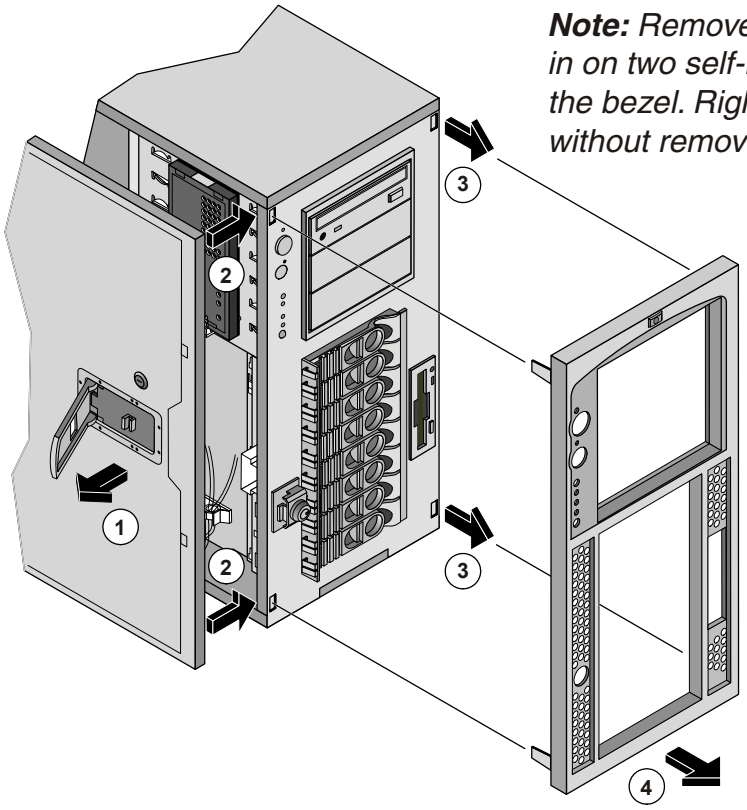

Note: Remove left cover and press in on two self-locking tabs to release the bezel. Right tabs will slide out without removing the right cover.
1
2
2
3
3
4

Figure 3-3. Removing the HP Server tc4100 Bezel

CAUTION	To prevent damage to the covers, support the cover as you remove it from the HP Server tc4100. The Server's covers can be easily damaged.

6. If necessary, remove the right side cover by lifting the plastic latch.

   The right cover only provides access to the Power Distribution Board and Floppy Disk Drive.

7. Pull the cover forward and then slightly sideways to disengage it.
8. Move it to the right and away from the chassis.

9. Remove top cover (only if necessary).

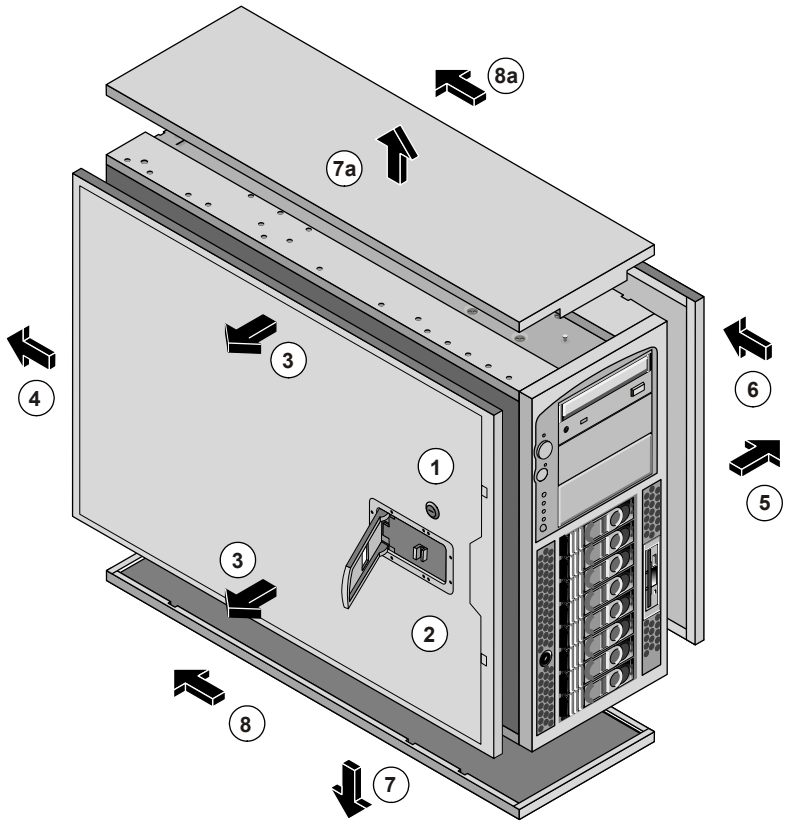


Figure 3-4. HP Server tc4100 Covers

10. To replace the left side cover, position the cover's tabs next to the respective holes along the outer edge on the side of the chassis.
11. Slide the cover toward the rear.
12. Close the plastic latch.
13. To replace the right side cover, position the cover's tabs next to the respective holes along the outer edge on each side of the chassis.
14. Slide the cover toward the rear.
15. Close the plastic latch.
16. To replace the bezel, insert the tabs at the bottom of the bezel into the slots on the chassis.
17. Swing the top of the bezel toward the chassis until it snaps into place.

Removing the Pedestal

The pedestal version of the HP Server tc4100 mounts to an anti-tip pedestal, which can be easily removed, if necessary.

1. Perform Steps 1-4 in the previous section, *"Removing Covers – Pedestal" on page 25*.

NOTE	The front bezel is shown removed, but the bezel may remain on the chassis while removing the pedestal.

2. Disconnect all cables connected to the rear of the Server that would limit its rotation before continuing.

3. Turn the Server over onto its top and pull up on the two tabs as shown in *Figure 3-5*.

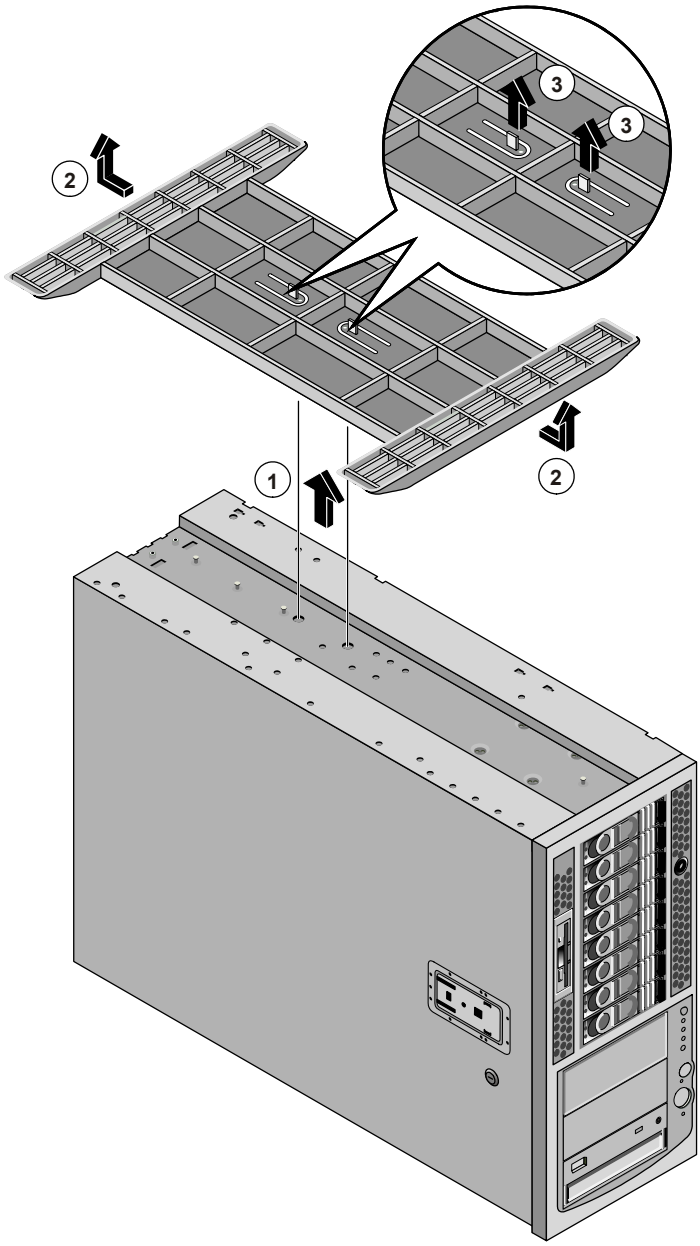


Figure 3-5. Removing the Pedestal

4. Slide the pedestal to the rear of the Server.
5. To re-install the pedestal, repeat Steps 1-3 and slide the pedestal forward onto the Server.

Mass Storage Devices

Introduction

This section describes how to install the internal mass storage devices, including the internal SCSI Hot Swap hard disk drives and Non-Hot Swap SCSI disk drives. The requirements for external SCSI drives are provided in the respective topic later in this section.

NOTE The embedded dual channel SCSI controller operates as a LVD (Low-Voltage Differential) controller, but if a SE(single-ended) device is connected to the controller, it automatically switches to SE and all SCSI devices connected to the controller must operate as SE devices. If your system was not configured with a backup tape drive, you must use a terminated non-hot swap cable for the tape drive.

Installing Storage Devices After Shipment

If you are installing mass storage devices that were not shipped with your HP Server tc4100, certain configurations may require additional cables or adapters not provided with your HP Server tc4100 shipment. For part numbers of the required items, such as HP cables, adapters, trays, and configuration information, see Information Assistant on the *HP Server tc4100 Navigator CD-ROM*.

For new products, you may use Order Assistant on the HP web site at:

http://www.hp.com

You may select “Buy HP” and choose the country and desired option that best suits your needs. You may also download the Order Assistant utility.

Tools Required

Torx T-15 driver (non-Hot Swap devices)

Drive Bay Shelves

The non-hot swap drives include the IDE CD-ROM and the 3.5 inch flexible disk drives which are standard for all HP Server tc4100 models and ship with each unit. The two empty drive shelves beneath the CD ROM drive support other non-hot swap SCSI devices, such as hard drives, tape back-up devices, or other HP-tested (LVD or SE) SCSI accessories.

The system chassis ships with a Hot Swap Mass Storage cage supporting up to eight low-profile Hot Swap hard drives.

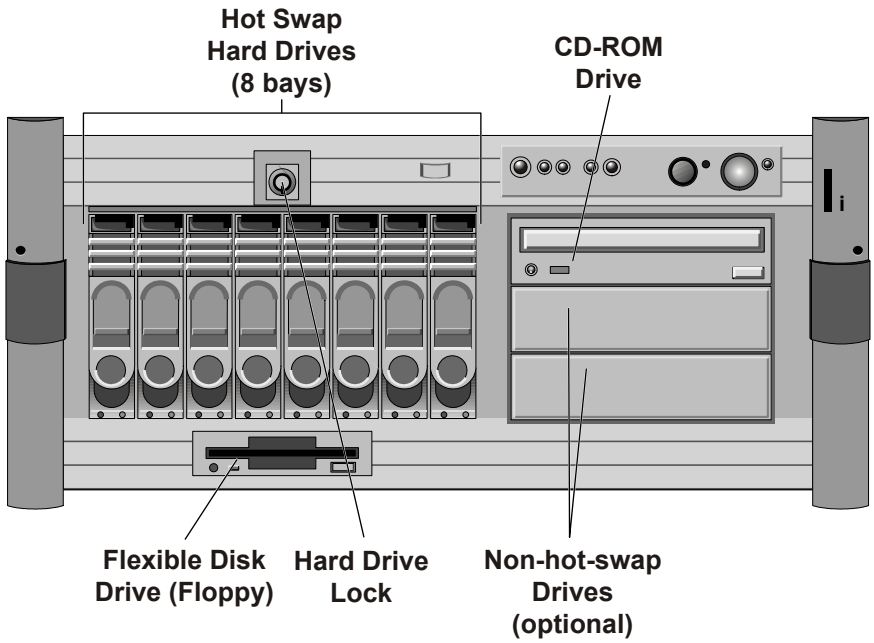


Figure 3-6. Standard Mass Storage Configuration

Boot Priority

This section details the HP Server tc4100's boot order by highest to lowest priority. The on-board SCSI controller has two channels, A and B. Channel B is typically used to control the Hot Swap SCSI drives. Channel A is typically used to control the internal non-hot swap SCSI drives. On each SCSI channel, the Server scans for a boot device starting at device ID 0 and proceeds up from there.

The HP Server tc4100's boot order (BIOS search order for a boot device) should be considered, when connecting cables from the on board SCSI channels.

By default the Server searches for boot devices in this order:

1. IDE CD-ROM drive
2. Flexible disk drive
3. SCSI A bus (typically non-Hot Swap internal SCSI devices)
4. SCSI B bus (typically Hot Swap Mass Storage Cage)
5. PCI Slot 6
6. PCI Slot 5
7. PCI slot 4
8. PCI slot 3
9. PCI slot 2
10. PCI slot 1
11. Embedded LAN

You can change this boot order using the Setup Utility (BIOS) by pressing F2 during the boot process, and the SCSI Configuration Utility by pressing Ctrl-C during the boot process.

Mass Storage Guidelines

- General Guidelines
  - Use care when unpacking and handling the disk drives.

    The hard disk drives are very susceptible to mechanical shock and can be easily damaged by a drop as short as one-quarter of an inch. If the drop would crack an egg, it will damage the drive.
  - Do not stack drives.
  - Do not use high voltage differential (HVD) SCSI devices on any of the SCSI channels or damage will occur. Use only Single-Ended (SE) or Low-Voltage Differential (LVD) devices.
- SCSI Device Selection
  - Ensure that the SCSI devices you install in *both* Hot Swap and non-Hot Swap-drive bays do not have terminations installed. The non-Hot Swap SCSI drives are connected to a terminated cable and the Hot Swap cage provides the termination for all slots in the cage.
  - Use only HP LVD SCSI 3.5-inch hard disk drives for the Hot Swap drive cage.

    You can only use low-profile (1.0 inch) drives in the Hot Swap cage. Be sure to use filler panels to cover any open slots. The HP Hot Swap drives come set for LVD SCSI operation and without device ID or termination. Do not change these settings.
  - Use only 3.5-inch or 5.25-inch SCSI devices for the non-Hot Swap shelves.

    The available space in the non-Hot Swap shelves supports two half-height (1.6 inch) devices. You can order HP mounting kits for removable media devices or trays for 3.5-inch hard disk drives (half-height). You may use narrow/wide SCSI adapters on these devices.
  - Use the SCSI Tape Drives specified in the *"Selecting SCSI Tape Drives" on page 38*.
- SCSI Drive Addressing
  - The drives in the Hot Swap Cage are automatically assigned SCSI addresses by the HP Server tc4100.

    The Hot Swap drive's address is dependent on its position within the drive cage.

    The Hot Swap Cage also supports the installation of an optional Duplex kit, which divides the cage in two halves. The installation of a Duplex board does not change the SCSI addressing.

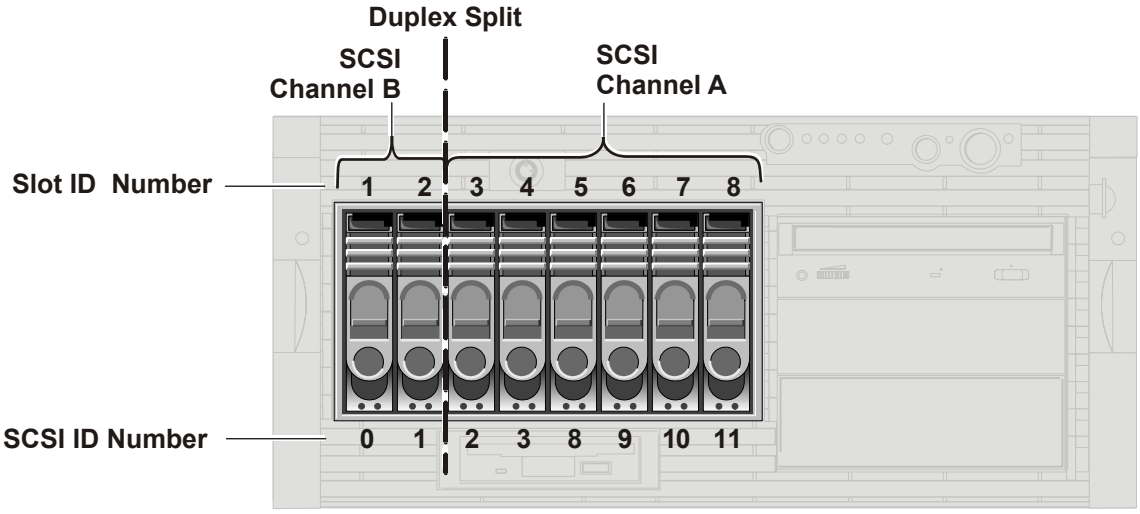


Figure 3-7. Hot Swap Device's Addressing with Duplex Board Installed

- The non-hot swap SCSI devices may use SCSI IDs from 0 through 15, with the following restrictions:

- Narrow SCSI devices must be addressed 0 through 6.
- Wide SCSI devices may be addressed 0 through 15, except for ID 7, which is held by the SCSI controller.

The non-hot swap SCSI devices are all connected to the same cable, which is terminated and connected to one SCSI controller. Each SCSI device connected to the non-hot swap device connector must have a unique address.

- SCSI Device Installation Order

  The order of hard drive installation is described below:

  - In pedestal configuration, start from the bottom of the Hot Swap drive cage when adding hard drives in the HP Server tc4100.

    If you are using one or more filler panels, insert them at the *top* of the cage. These configurations may use filler panels to close up the front of the Hot Swap mass storage cage. If there are gaps in the cage, the drives may not receive the proper ventilation and could suffer thermal damage.

  - In rack configuration, start from the left of the Hot Swap drive cage when adding hard drives in the HP Server tc4100.

    If you are using one or more filler panels, insert the panels on the *right* side of the drive cage. These configurations may use filler panels to close up the front of the Hot Swap mass storage cage. If there are gaps in the cage, the drives may not receive the proper ventilation and could suffer thermal damage.

- Filler Panels

  - Ensure all empty slots in the Hot Swap drive cage have filler panels inserted to ensure proper airflow.

    If there are fewer drives than the Hot Swap drive cage supports, a 1-inch *filler panel* must be inserted in each empty disk location. The filler panels ensure the drive cage has the proper ventilation and airflow. The filler panel will be removed before inserting a new drive.

CAUTION	To prevent overheating or excessive electromagnetic radiation, use the filler panels to fill the gaps between Hot Swap hard drives. If the filler panels are left out of the drive shelves, thermal damage and/or excessive EMI could occur.

Cabling Configurations

CAUTION	There are various SCSI cable configurations associated with the system and, if incorrectly configured, could cause damage to the HP Server tc4100 and the SCSI devices.

There are various SCSI cable configurations associated with the HP Server tc4100 and if all possible SCSI devices and connections are used, then an additional SCSI disk controller is required. Table 3-2 describes the various cables and where each one can be connected.

NOTE	The correct cable routing of the hot-swap hard disk drive SCSI cable is having it connect from either a PCI disk controller, or SCSI B on the system board to SCSI A on the hot-swap hard disk drive backplane.

Do not connect the SCSI terminated cable # 3 (this cable is optional and must be purchased separately) to the Hot Swap Mass Storage Cage's connector A or B, or unreliable operation will occur.

- The Hot Swap Mass Storage Cage can have up to eight drives with only one SCSI cable connected.

- The Hot Swap Mass Storage Cage can also be split into two parts, with up to two drives on one SCSI bus and 6 drives on the other SCSI bus (requires duplex board accessory kit). This requires two SCSI cables (additional SCSI cables are included in the duplex board accessory kit).

  If the duplex board is installed, the embedded dual channel SCSI controller, a dual channel SCSI disk controller board, or a DAC board must be used to control the two halves of the Hot Swap Mass Storage Cage.

Table 3-1. Internal Cable Designations

Cable Designation	Description	Source
Floppy Disk Cable	This cable always connects to the Flexible disk drive in the system.	This cable can only connect to the floppy connector on the system board.
IDE Cable	This cable always connects to the IDE devices (CD-ROM) in the HP Server tc4100.	This cable can only connect to the embedded IDE connector on the system board.
Round Twisted Pair SCSI Cable	This cable always connects to the non-hot swap drives and has a termination at the end.	This cable can be connected only to the embedded SCSI A channel and a PCI SCSI Card or a PCI HP NetRAID card.
Flat Twisted Pair SCSI Cable	This cable always connects to the Hot Swap Mass Storage Cage and has no termination.	This cable is typically connected to the embedded SCSI B channel, a SCSI disk controller board, or a HP NetRAID (DAC) board.
Internal/External SCSI Cable	This sheathed ribbon cable (optional) is always used for the external connector.	This cable can be connected only to the embedded SCSI channel A.

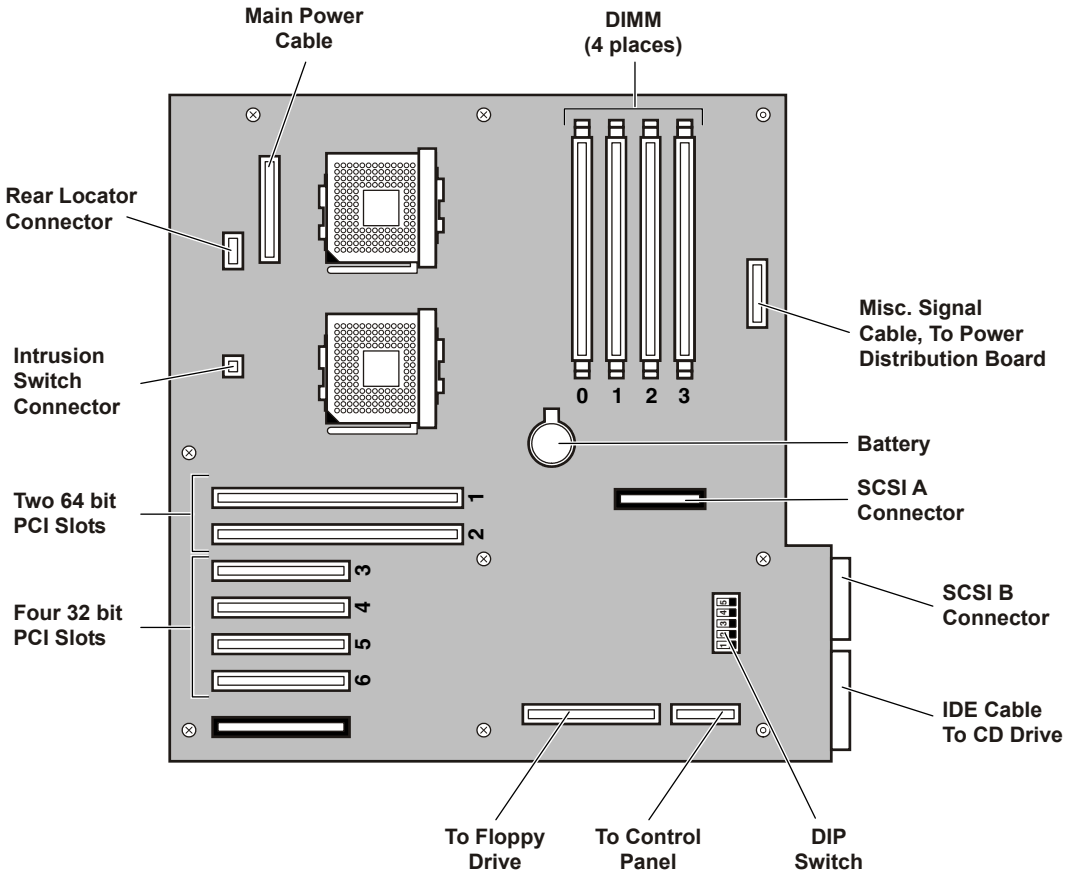


Figure 3-8. SCSI Connectors for Hot-Swap and Non-Hot Swap Drives

Installing Hot Swap Hard Drives

Use this section to install Hot Swap hard drives in the Hot Swap drive cage.

CAUTION	Protect the drive from static electricity by leaving it in its antistatic bag until you are ready to install it. Before handling the drive, touch any unpainted metal surface to discharge static electricity. When you remove the drive from the antistatic bag, handle it only by the frame. *Do not touch* the electrical components. If you have to handle electrical components, wear the antistatic strap. Place the drive on the antistatic bag whenever you set it down.

1. Ensure that the hard disk cage is unlocked, if it is locked, use the key to unlock it.
2. Remove the filler panel from the location you want the Hard Drive installed by simply pulling it straight out.
3. Open the drive module by pressing in on the locking latch at the center of the drive ejector handle and pulling the handle open. See *Figure 3-9*.

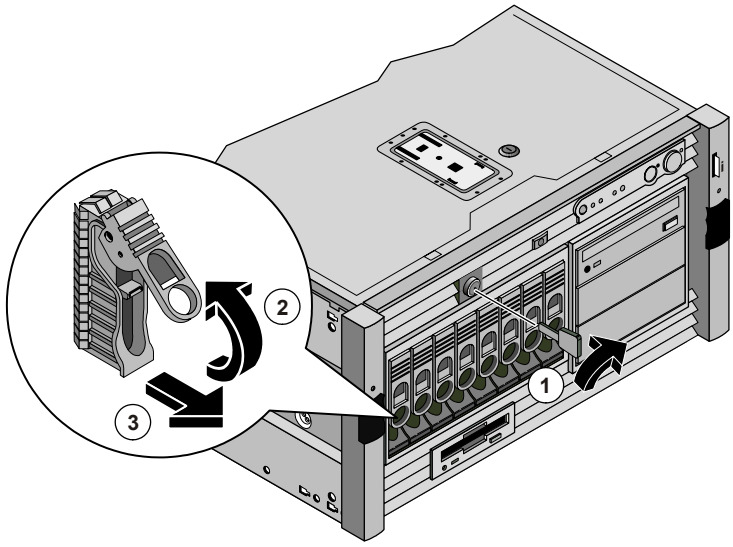


Figure 3-9. Opening the Drive Module

CAUTION	To prevent snapping off the handle do not use extreme force when opening it. Open the handle until you feel resistance.

4. Gently slide the drive module into the cage and stop when you feel resistance.

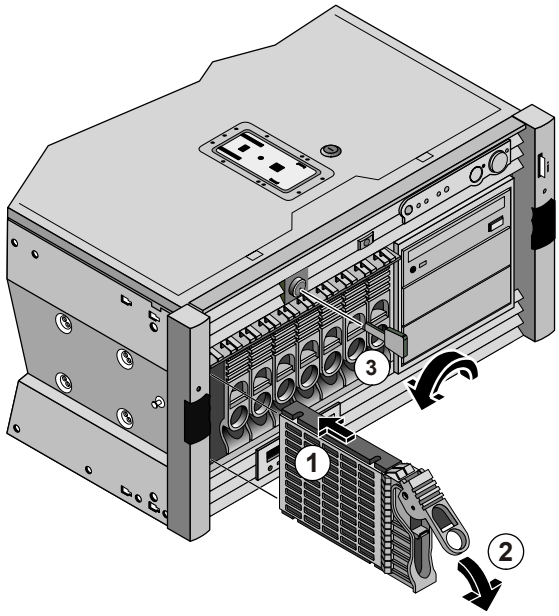


Figure 3-10. Inserting the Drive

5. Verify that the two pins behind the pivot end of the handle engage the holes in the edge of the cage.
6. Press the ejector handle in until you feel the latch click into place.

   Closing the ejector handle engages the drive with the electrical connector in the Hot Swap drive cage and seats the drive.
7. If the drive is unseated in the cage after closing the ejector handle, repeat this procedure from Steps 3 to 6. The handle was probably not pulled out far enough, and the locking latch failed to engage the Hot Swap mass storage cage.

NOTE	Closing the ejector handle engages the drive with the electrical connector in the Hot Swap mass storage cage and seats the drive.

Removing Hot Swap Hard Drives

CAUTION	You must remove the drive slowly to ensure the drive heads are parked prior to removal. Ensure that you follow these instructions carefully to prevent handling damage, such as head slaps or head actuator unlocking.

1. To unlock the drive, push the locking latch in and then pull the ejector handle toward you.
2. Gently pull the drive out about an inch to disengage the power connection.
3. Wait about 30 seconds for the drive to stop spinning and the drive heads to park.
4. Use your hand to support the bottom of the drive, while you slowly pull the drive straight out.

   Do not allow the drive to fall.
5. Place the drive in an electrostatic-protected container.

   Do not stack drives.

Installing Non-Hot Swap Storage Devices

Use this section to install any of the non-hot swap mass storage devices used as a hard drive or a tape backup storage.

CAUTION	Protect the drive from static electricity by leaving it in its antistatic bag until you are ready to install it. Before handling the drive, touch any unpainted metal surface to discharge static electricity. When you remove the drive from the antistatic bag, handle it only by the frame. *Do not touch* the electrical components. Place the drive on the antistatic bag whenever you set it down.

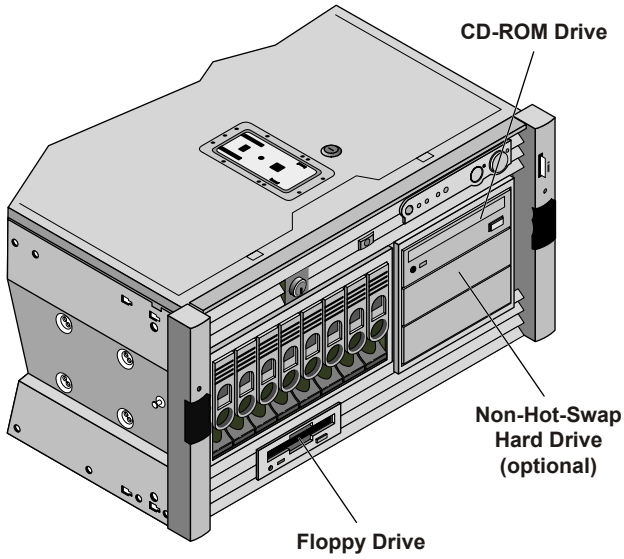


Figure 3-11. Non-Hot Swap Drive Shelves

To install a drive in the non-hot swap drive bay:

1. Shut down the HP Server tc4100's NOS.
2. Disconnect the power cords.
3. If working on a pedestal-mounted Server, remove the covers and front bezel and gain access to the HP Server tc4100's non-hot swap-drive bays.
4. If working on a rack-mounted Server, follow the appropriate instructions to safely extend the Server from the rack. Then remove the covers and front bezel.
5. Select an available drive bay for the device and remove the filler panel.
6. Configure the device according to the manufacturer's instructions.

   Refer to SCSI addressing in *"Mass Storage Guidelines" on page 31*.
7. If you are installing a boot device, check the boot priority described earlier in this chapter.
8. If the device does not already have a storage tray or mounting hardware, install the appropriate mounting hardware on the device.

   Refer to the directions included with the device's mounting hardware.
9. Slide the drive into the open shelf.

10. Connect the power cable and the appropriate data cable (SCSI) from the system board or SCSI controller to the device.
11. The air flow guide, the fan assembly, and the fan cage may need to be removed to access the back of the drive cage to connect the drive data and power cables.
12. Replace the cover(s) and front bezel.
13. If the Server is rack mounted, slide it back into the rack and secure it.
14. Return power to the Server and run the Setup Utility to configure the device.

Selecting SCSI Tape Drives

NOTE Tape drives do not come with the mounting hardware that is required for installation. Be sure to order the appropriate mounting kit (HP product number Q1447A).

Table 3-2 lists the supported tape drive models with their respective part number, size (half height or full height), and the Hp Server location in which the tapes are supported. *Figure 3-12* displays linear drawings of the HP Server tc4100 rack and pedestal versions with the locations for the different SCSI Tape Drive models. Use*Figure 3-12* to match the codes on the "Supported Location" column of *Table 3-2*.

Table 3-2. SCSI Tape Drives Specification

DRIVE	Size	Part No.	Supported Location	Comments
DLTVS 80i	Half Height	C7405A	R1 or R2, P2 or P3	Use the plastic drive rails when installing.
DAT 40i	Half Height	C56864A	R1 or R2, P2 or P3	Use the plastic drive rails when installing.
Ultrium 215i	Half Height	C7420A	R1 or R2, P2 or P3	Use the metal drive rails when installing on the server.
DAT 24i	Half Height	C1555D	R1 or R2, P2 or P3	Use the metal drive rails when installing on the server.
DAT 24x6i	Full Height	C5677B	R1 and R2, P2 and P3 (Two HH slots are required)	Use the metal drive rails when installing on the server.
Ultrium 230i	Full Height	C7400A	R1 and R2, P2 and P3 (Two HH slots are required)	If this drive is installed in position P2 or P3, it is necessary to remove the power protection bracket of the server. Drive will extend slightly from the front of the server. Use the metal drive rails when installing on the server.
DAT 40x6i	Full Height	C5677A	R1 and R2, P2 and P3 (Two HH slots are required)	If this drive is installed in position P2 or P3, it is necessary to remove the power protection bracket of the server. Use the metal drive rails when installing on the server.

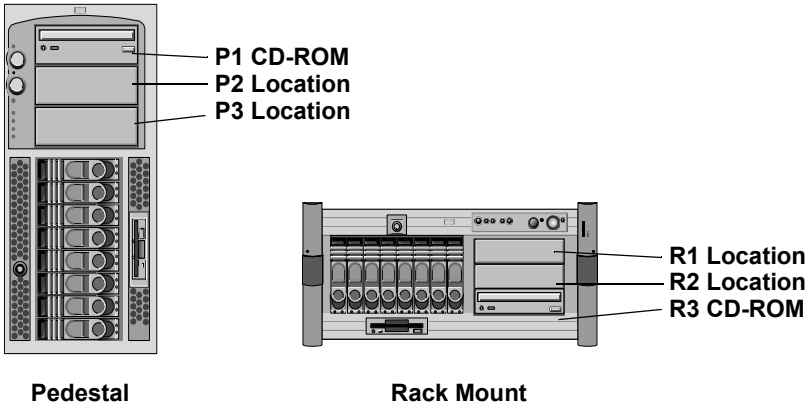


Figure 3-12. SCSI Tape Drives Supported Location

Connecting External SCSI Devices

An accessory can be ordered for the HP Server tc4100 which will provide an external SCSI connection from the SCSI A connector embedded on the system board.

A SCSI disk controller board or a DAC board inserted into one of the PCI slots may also provide an external SCSI connection. The last device in the SCSI chain of external devices must be terminated.

CAUTION	Do not use high voltage differential (HVD) SCSI devices on any of the SCSI channels or damage will occur. The HVD SCSI devices are not supported. Use only Single-Ended (SE) or Low-Voltage Differential (LVD) devices to connect to the external connectors.

Memory Modules

Introduction

This section provides the instructions for installing and removing DIMMs on the system board in the HP Server tc4100. The video memory comes with 8 MB standard and cannot be upgraded.

NOTE	The EDO DIMMs and PC 100 SDRAM DIMMs from earlier HP Server tc4100 models will fit into the DIMM slots in the Server, but the EDO DIMMs and PC 100 SDRAM will not function properly. Use only 133 MHz SDRAM DIMMs acquired from HP.

To ensure you have the correct DIMMs before installation, refer to one of the following for a list of qualified DIMMs:

- Technical Reference Label inside the HP Server tc4100's top or side coverHP Order Assistant on the HP web site at:

  http://www.hp.com

- Information Assistant on the HP Server tc4100 Online Documentation CD-ROM
- HP Customer Service

Tools Required

Antistatic service kit (3M™ 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Memory Installation Guidelines

- The HP Server tc4100 uses only 133 MHz (PC133) SDRAM DIMMs, which are electrically different from the EDO and PC100 SDRAM memory modules used in other HP Server models.
- DIMMs sizes supported are 128 MB, 256 MB, 512 MB, or 1 GB in any combination.
- Supported memory capacity ranges from 128 MB to 4 GB maximum (1 GB per DIMM slot and 4 DIMM slots total). The minimum capacity is 128 MB (one DIMM).
- DIMM sizes may be mixed on the system board and may be loaded in any order.
- Open slots between DIMMs are permitted.
- When handling DIMMs, observe antistatic precautions to avoid damage.

DIMM Installation

Use this procedure to install each DIMM in a DIMM slot on the system board.

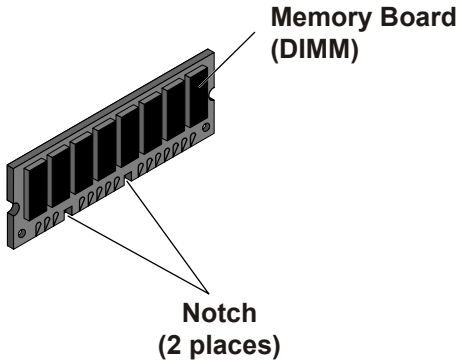


Figure 3-13. Individual SDRAM DIMM

CAUTION	Do not install EDO DIMMs or PC100 SDRAM from other HP Serves models. Use only DIMMs specified for this model.

To install additional memory in the HP Server tc4100:

1. To gain access to the HP Server tc4100, perform one of the procedures listed below.

NOTE	It is not necessary to remove the system board from the HP Server tc4100 to install the additional DIMM memory.

   - If the Server is mounted on the pedestal, perform Steps 1-8 from *"Removing Covers – Pedestal" on page 25*.
   - If the Server is in the rack, perform steps 1-14 from *"Removing Covers – Rack-Mount" on page 21*.
2. Remove Air Scoop.

3. Locate the DIMM slot for installation and spread the two retaining clips outward. See *Figure 3-14*.

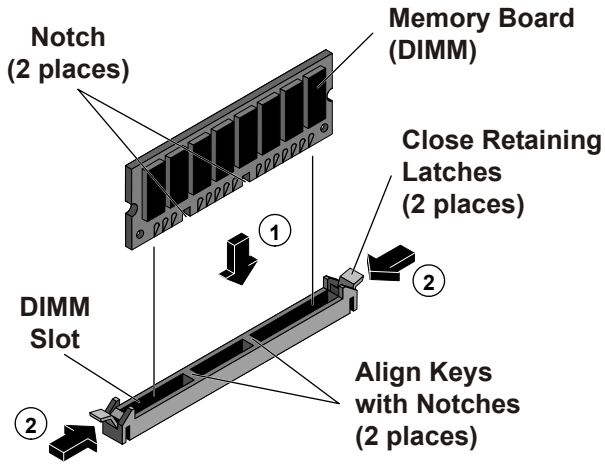


Figure 3-14. Opening Retaining Clips

4. Ensure retaining clips are open and then align the notches on the DIMM with the keys on the DIMM slot, holding the DIMM at a 90° angle to the system board. *Figure 3-14*.

5. Insert the DIMM fully into the slot, handling the DIMM by its edges. See *Figure 3-15*.

   The retaining clips should grasp the DIMM automatically if it is inserted properly. If the clips do not close, the DIMM is not inserted correctly.

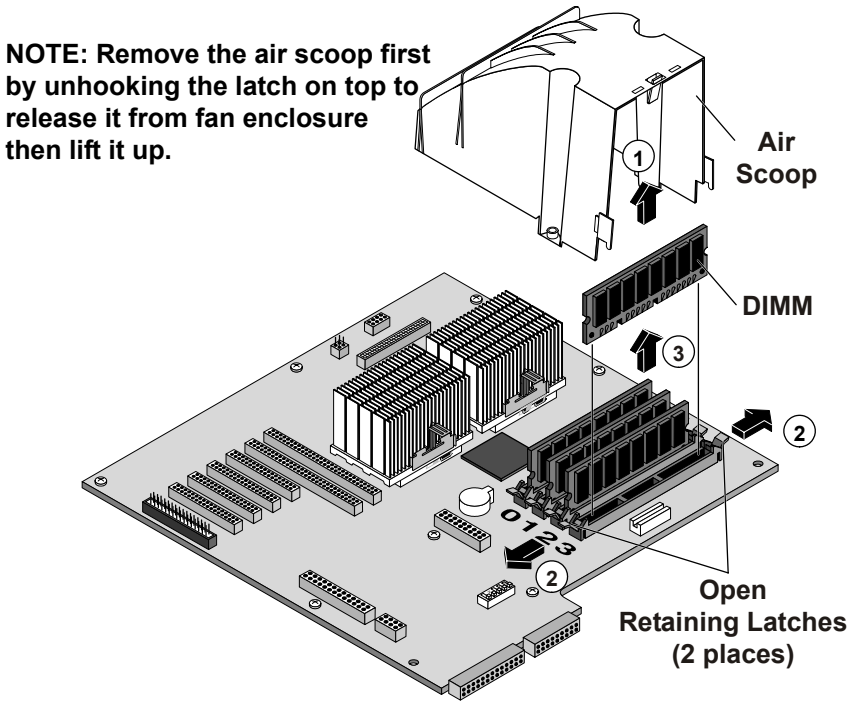


Figure 3-15. Installing the DIMM

CAUTION	Do not rock the DIMM into place, but apply firm and even pressure. If the retaining clips do not close, remove the DIMM and repeat Steps 5-6

6. Re-install the Air Scoop.

7. If all DIMMs have been installed, re-assemble the server.

   Refer to *"Opening and Closing the HP Server tc4100" on page 21*.

8. If the Server is in a rack installation, return the chassis into the rack.
9. Reconnect the power cord(s).
10. Power on the HP Server tc4100 according to the respective NOS power up instructions.
11. Return the HP Server tc4100 to normal operation.

DIMM Removal

Use this procedure to remove DIMMs from the HP Server tc4100's system board. The HP Server tc4100 must be powered down and the appropriate cover must be removed from the HP Server tc4100 before removing any DIMMs.

1. If you have not already removed the appropriate cover from the HP Server tc4100, perform one of the procedures listed below.
   - If the Server is mounted on the pedestal, perform Steps 1-8 from *"Removing Covers – Pedestal" on page 25*.
   - If the Server is in the rack, perform steps 1-14 from *"Removing Covers – Rack-Mount" on page 21*.
2. Remove the Air Scoop.
3. Select the desired DIMM(s) to remove.
4. Open the DIMM's retaining clips to lift the DIMM's top edge away from the clips. See *Figure 3-14*.
5. Lift the DIMM completely away from the slot. See *Figure 3-14*.
6. Place the DIMM in its antistatic container.
7. Re-install the Air Scoop.

NOTE Ensure the retaining clips on the DIMM slots for each DIMM are closed before replacing the cover onto the HP Server tc4100.

An error will be displayed if all DIMMs are removed.

8. If the Server is a rack installation, return the chassis into the rack.

   Refer to *"Opening and Closing the HP Server tc4100" on page 21*.
9. Re-install the bezel onto the front of the HP Server tc4100.

   Refer to *"Opening and Closing the HP Server tc4100" on page 21*.
10. Reconnect the power cord(s).
11. Power on the HP Server tc4100 according to the respective NOS power-up instructions.

    Refer to *Chapter 1, Control and Indicators*.
12. Return the HP Server tc4100 to normal operation.

Processors

Introduction

The HP Server tc4100 supports two processors that must operate at the same speed and cache size. Both processors sockets are located on the system board.

The HP Server tc4100 supports the Pentium III processors at a front side bus (FSB) speed of 133 MHz. Advanced processors may be supported as each one becomes available. Contact HP or your reseller for details.

The Server ships with one processor in the primary processor socket.

Tools Required

An antistatic service kit (3M™ 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Processor Configuration Guidelines

The HP Server tc4100 supports a variety of processor speeds with an FSB speed of 133 MHz.

CAUTION	Do not open the new processor's protective bag or remove it from the bag until you are ready to install it. Before you remove a processor from the antistatic container, touch a grounded, unpainted metal surface on the HP Server tc4100 to discharge static electricity.

- Both processor modules must be the same processor type and have the same product number, which insures the same clock speed, cache size, and FSB speed.
- The processor modules must operate at the designated speed stated by the product type on the processor.

CAUTION	Do not set the processor speed switches to any other speed, as this can result in unreliable or intermittent performance, and data integrity may also be at risk.

- Use only processor upgrade kits with the same HP product number. This ensures the processor type, clock speed, and cache size match, and that product numbers are compatible.
- If you want to upgrade the primary processor, you do not have to remove the termination card.

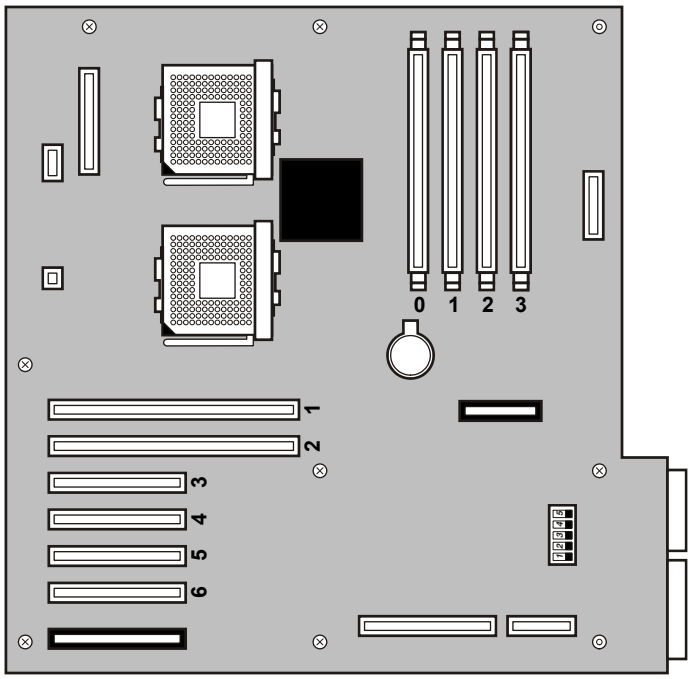


Figure 3-16. System Board

Installing the Processor

The installation procedure is the same for the rack-mounted models as for the pedestal models of the Server once you gain access to the system board.

CAUTION	Use an antistatic wrist strap and a grounding mat. Wear a wrist-strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin.

1. Unpack the processor shipping box and check the contents against its packing list.

CAUTION	Do not remove the processor from its bag until you are ready to install it and ensure the bag remains sealed until then

2. Gracefully shut down the network operating system according to directions in your NOS documentation.
3. Press the power switch on the HP Server tc4100's control panel when prompted by the operating system. Normally, this completes the shutdown procedure.
4. Disconnect the power cords and any connected phone lines.

WARNING	Power supplies will continue to provide standby current to the Server until the power cords are disconnected.

5. To gain access to the system board, follow the appropriate instructions for removing the cover.
   - If the Server is mounted on the pedestal, perform Steps 1-8 from the *"Removing Covers – Pedestal" on page 25*.

- If the Server is in the rack, perform steps 1-14 from *"Removing Covers – Rack-Mount" on page 21*.

NOTE	It is not necessary to remove the system board from the Server to install the new processor module.

6. Verify the processor speed and FSB setting, before installing the second processor module. Both processor modules must have the same clock speed, cache size, FSB speed, and product number.

NOTE	When installing a second processor, the processor speed is set automatically. No manual setting of switches is necessary.

NOTE	The System board is shown removed from the HP Server tc4100 for simplicity in the following figures, but it is not necessary to remove the system board to install the new processor module.

7. Remove the terminator from the secondary processor socket by lifting up the lever and pulling the terminator upwards.

NOTE	Save the terminator in the CPU protective bag for future needs.

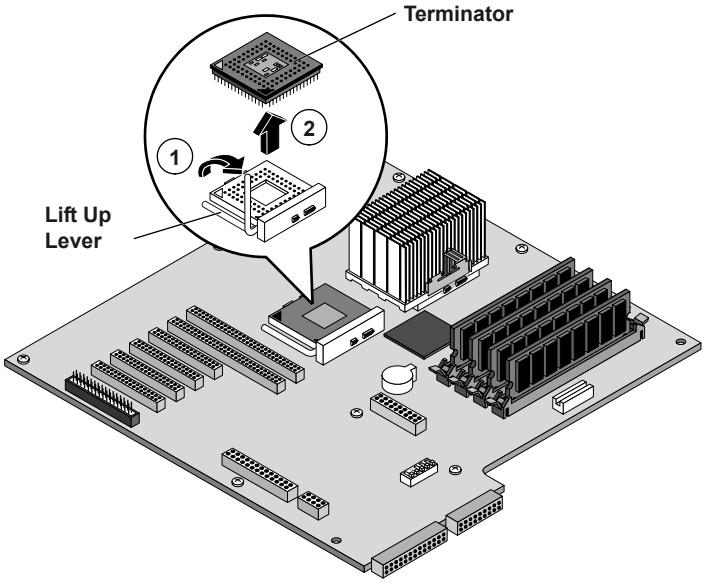


Figure 3-17. Remove Terminator Board

8. Remove the processor module from the sealed bag.

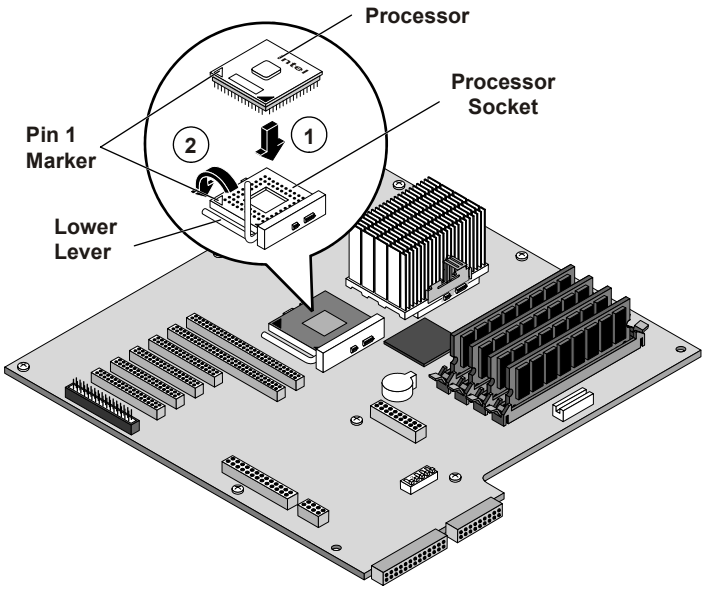


Figure 3-18. Installing the Processor

9. Align the additional processor module over the secondary processor module socket by matching the corner of the processor that has fewer pins with the corner of the socket that has fewer pins.
10. Gently push down on the processor module until it seats.
11. Lower the lever to completely seat the processor module firmly in the connector.

NOTE	When you purchase an additional processor module, the package includes the heat sink that sits on top of that processor. Also, the thermal grease is already applied to the bottom of the heat sink.

12. To install the heat sink:

CAUTION	Do not ingest or inhale the thermal grease (heat sink compound). Do not get it in your eyes. Avoid prolonged skin contact, which can cause irritation. Wash with water any skin that contacted thermal grease. If thermal grease gets in your eye, flush the eye with water. If ingested, do not induce vomiting. Consult a physician.

NOTE	When you purchase an additional processor module, the package includes the heat sink that sits on top of that processor. Also, the thermal grease is already applied to the bottom of the heat sink.

CAUTION	Ensure you have made good contact with the processor to avoid thermal overheating. If you have not made good contact with the processor, it will overheat within 20 seconds of power on and will shut down.

- Apply a very small amount (the size of 1/2 grain of rice) of thermal grease to the center core of the processor (the raised rectangle in the center of the processor).

- Spread the grease carefully over the core using a single-edge razor blade or some other tool as long as the tool is clean. Don't allow the grease to spread beyond the edges of the core rectangle
- Center the heat sink properly over the additional processor
- Locate the bottom notched edge of the heat sink and, when placing the heat sink over the processor, be sure that the notched edge faces the front panel of the HP Server tc4100.

CAUTION	Minimize any twisting or lateral sliding when installing the heat sink on the processor. Ensure you have made good contact with the processor to avoid thermal overheating. If you have not made good contact with the processor, it will overheat within 20 seconds of power on and will shut down.

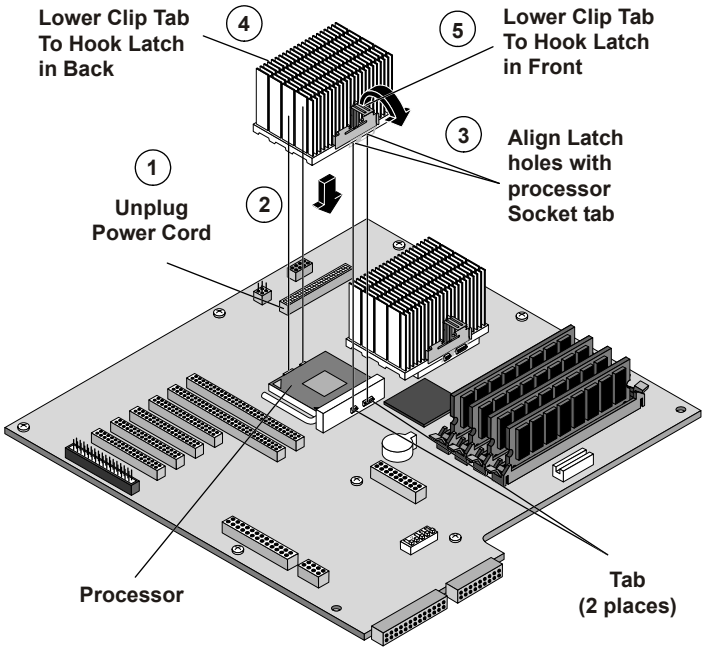


Figure 3-19. Installing Heat Sink

NOTE	Before the processor heat sink can be latched on, the Air Scoop must be removed from the fan wall. If you do not remove the Air Scoop, the front heat sink clip can not be accessed.

13. Fasten the rear heat sink clip by matching the holes of the clips with the tabs of the socket.
14. Fasten the front heat sink clip in the same fashion.
15. Re-install the Air Scoop.
16. Re-install the cover and bezel onto the Server according to the appropriate procedure.

    Refer to *"Opening and Closing the HP Server tc4100" on page 21*.
17. Return power to the Server and restore normal operation.

Accessory Boards

Introduction

This section describes how to install accessory boards into the system board of the HP Server tc4100. The system board provides up to six PCI slots (P1 through P6), two of which are 64-bit slots.

Tested PCI Boards

For a list of tested PCI boards, check for compatibility in Configuration Assistant on the Navigator CD-ROM or look for the Hardware Tested Products list for the HP Server tc4100 under the Service and Support topic for the specific NOS used in the Server at HP's web site:

http://www.hp.com

CAUTION	Some accessory board outputs may exceed U.S. National Electrical code (NFPA 70) Class 2 or limited power source limits and must use appropriate interconnecting cabling in accordance with the National Electrical Code. (All Hewlett Packard boards comply with Class 2.)

Tools Required

The following tools are required for installation or removal of the accessories boards in the HP Server tc4100:

- An antistatic service kit (3M™ 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap with ground lead.
- Torx 15 screw driver.

HP Server Remote Management Card

The HP Server Remote Management Card has to be installed in slot 6. There is a 50-pin connector/cable that should connect the HP Server Remote Management Card and the system board.

Boot Priority

This section details the HP Server tc4100's boot order by highest to lowest priority. The Server's boot order (BIOS search order for a boot drive) should be considered when selecting a slot on the system board. This is especially important if you are installing a SCSI disk controller board. The disk controller's boot priority is set by the board's slot location.

The on-board SCSI consists of two channels, A and B. Channel B is typically used to control the Hot Swap SCSI drives. Channel A is typically used to control the internal non-hot swap SCSI drives. On each SCSI channel, the system scans for a boot device starting at device ID 0 and works up from there.

By default the Server searches for boot devices in this order:

1. IDE CD-ROM drive
2. Flexible disk drive
3. SCSI A bus (typically the non-Hot Swap internal SCSI devices)
4. SCSI B bus (typically the Hot Swap Mass Storage Cage)
5. PCI slot 6
6. PCI slot 5
7. PCI slot 4
8. PCI slot 3

9. PCI slot 2
10. PCI slot 1
11. Embedded LAN

NOTE	The Server can be configured to boot from a PCI accessory board or PCI-based DAC, instead of the onboard SCSI channels, by putting the board in one of the PCI slots. The SCSI Configuration Utility can be used to configure the Server to skip over the onboard SCSI channels and select a PCI slot instead, when scanning for boot devices.

IRQ Settings

The IRQ settings are automatically assigned and do not require user intervention. PCI boards have the capability to share hardware interrupts (IRQs) with other PCI boards, as stated in the PCI specifications, but this does not always prove to be true between board manufacturers.

The HP Server tc4100 provides various ways to automatically share interrupts in the Server. The sharing mode can be selected under the heading “Sharing Algorithms” in the Setup Utility. The IRQs are automatically assigned during boot up for each PCI slot and embedded device in the Server, avoiding any IRQ conflicts and providing the best performance. This feature also provides a way of manually assigning IRQs when disabling the Sharing Algorithm feature.

These IRQ assignments trigger the installed NOS to enable the APIC (Advanced Programmable Interrupt Controller), which takes control of the IRQ sharing scheme. You are not required to manually assign interrupts for the following NOSs:

- Microsoft’s NT 4.0
- Novell’s NetWare 5
- SCO UnixWare 7

NOTE	CO UnixWare 7 requires installation of the OSMP module to enable the APIC.

System Board PCI Slots

All accessory boards plug into the six slots on system board at the rear of the Server’s chassis.

- Four PCI slots (Slots 3 - 6) support full length 32-bit boards at a clock rate of 33 MHz. These slots only support +5 VDC power and Universal boards. These slots have keys in the upper half of the board slot to prevent 3.3 volt boards from being inserted into the slots.

NOTE	Universal boards automatically switch to accept power from a +5.0 or +3.3 VDC source and have a key slot in the connector to allow installation in any of the 6 PCI slots.

- Two PCI slots (Slots 1 - 2) support full-length 32- or 64-bit boards at clock rates of 33 or 66 MHz. These slots only support +3.3 VDC power and Universal boards. These slots have keys in the upper half of the board slot to prevent 5volt boards from being inserted into the slots. See *Figure 3-20*.

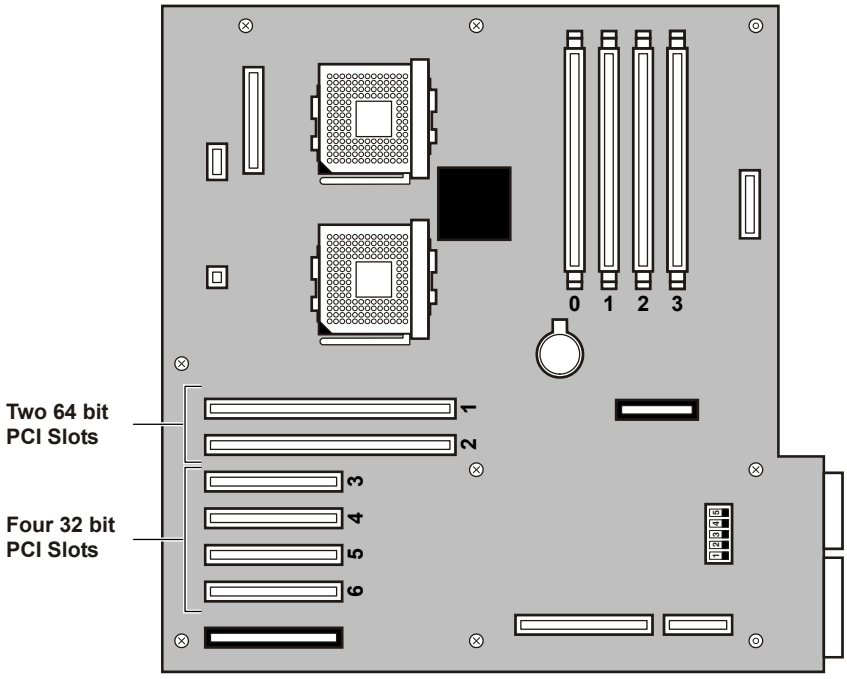


Figure 3-20. System Board PCI Slots

CAUTION	Some accessory board outputs may exceed U.S. National Electrical code (NFPA 70) Class 2 or limited power source limits and must use appropriate interconnect cabling in accordance with the National Electrical Code.

Installing Accessory Boards

Use this procedure to install all accessory boards.

1. Read the documentation included with each board and follow any special instructions provided.

CAUTION	To prevent a system crash, never remove or insert a PCI board from or into a slot with the Server powered on. Always turn power off to the Server before performing any installation or removal operations.

2. Log off all users and back up all files.
3. Follow the instructions in the respective NOS (network operating system) documentation to gracefully shut down all networking software and applications.
4. Press the power button on the HP Server tc4100's control panel when prompted by the operating system. Normally, this completes the shutdown procedure.

NOTE	The power supplies will continue to provide standby current to the Server until the power cord is disconnected.

5. Gain access to the Server by performing the appropriate procedure.

- If the Server is mounted on the pedestal, perform Steps 1-8 from *"Removing Covers – Pedestal" on page 25*.
- If the Server is in the rack, perform steps 1-14 from *"Removing Covers – Rack-Mount" on page 21*.

6. Consider the boot priority before installing any accessory boards.

   If installing a SCSI disk controller board, the controller's priority (BIOS search order for a boot drive) is set by the board's slot location. For details, refer to Boot Priority earlier in this chapter.

7. Identify the desired slot (1 through 6), before installing the accessory board.
8. Remove the slot cover from the Server's rear panel, before installing the new board into the slot, as shown in *Figure 3-21*.

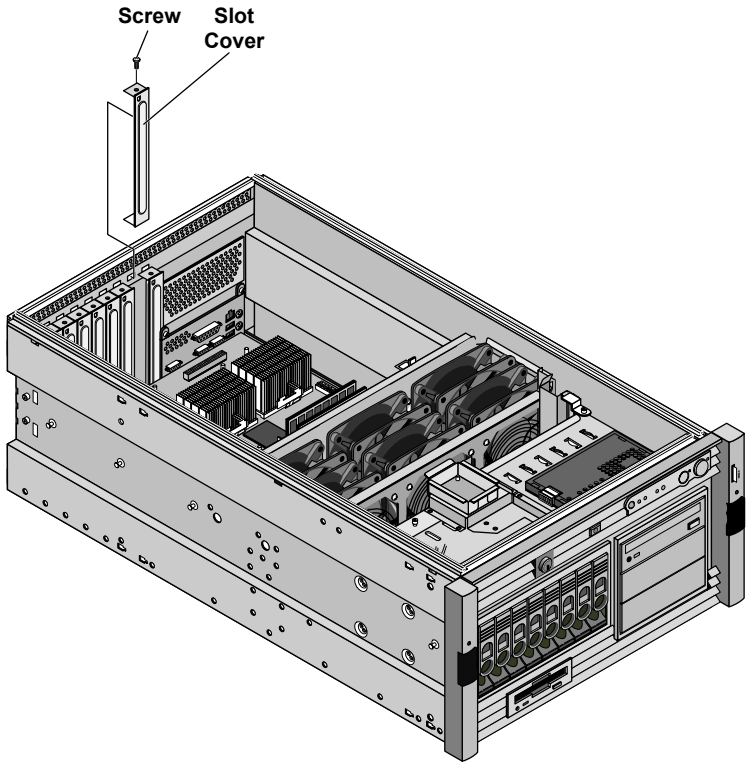


Figure 3-21. Removing the Slot Cover.

NOTE	Each PCI slot must have a slot cover or PCI board in the slot. Ensure that all unused slots have slot covers.

CAUTION	Do not bend the PCI board to install it into the slot. If a full-length PCI board has a handle on the end of the board that prevents its installation, remove the handle before installing the board.

9. Before installing the new PCI board:
   - Verify there is no handle attached to it, especially if it is a full-length board.
   - If it has a handle attached, remove the handle before installing the board into the slot.
10. Align the board with its slot along its full length and position it into the slot.
11. Push the PCI board down into its connector in the System board.

12. Secure the PCI board as shown in *Figure 3-22*.

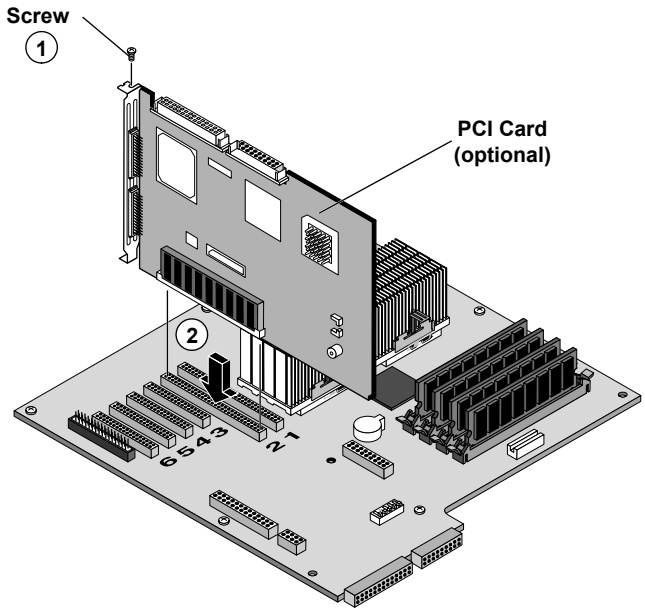


Figure 3-22. Installing the Accessory Board

13. If the installed accessory board requires an external connection or a connection to the System board, ensure that the cable is properly attached.

    Refer to the accessory board documentation for connection requirements.

14. If accessory board installation is complete, re-assemble the Server.

15. If all installation work is complete, return power to the Server according to the respective NOS power up instructions.

16. Use the respective NOS software to ensure the correct software drivers for the PCI board are loaded and verify correct operation.

Configuring the HP Server tc4100

Introduction

This chapter supports setting up software on your HP Server tc4100. You may choose to do this before or after you install the Server in the rack.

HP Server tc4100 Navigator CD-ROM

The *HP Server tc4100 Navigator CD-ROM* provides you with two choices for running the CD-ROM and accessing its configuration information and utilities.

- Run the Navigator CD-ROM on the HP Server tc4100 in order to configure the tc4100 and HP Accessories and to obtain the required configuration information and drivers needed to set up the Server.

  You need to the run the Navigator CD-ROM on the Server to install the NOS and all the bundled drivers and utilities. Refer to the following topics for the contents of Navigator's Main Menu when used on the Server.

- Run the Navigator CD-ROM on any Windows PC after setting up the HP Server tc4100 to obtain the required configuration information and create any needed NOS installation diskettes.

  Refer to *"Running the Navigator CD-ROM on a Windows PC" on page 67*.

Contents of the Navigator CD-ROM – HP Server tc4100

The Main Menu directs you to modules where you can perform configuration tasks or create the diskettes required for installation including the Utilities. The Information Assistant button directs you to the *HP Server tc4100 Online Documentation CD-ROM*. The menu buttons are:

- Navigator Overview

  Describes the functions and modes available when using the HP Server tc4100 Navigator program whether at the server or client.

- What's new on the CD

  Lists changes implemented in system BIOS, software and firmware since the last version of the CD.

- System README

  Provides solutions to issues found after the system documentation was published.

- View Hardware Inventory

  Lists details about the selected server, including installed hardware, system resources and firmware versions.

- Change NOS Selection

  Allows you to go back to reselect the Network Operating System to be used throughout your session. System reselection may be done using the Toolbox.

- Configure the Server

- Guided Setup

  Walks you through the steps required to setup and configure server hardware components (like the server's hard disks, disk array, and remote management feature), and install the Network Operating System on your server. HP recommended defaults and configuration advisories are provided where possible. A progress bar is displayed at the bottom of the screen that tells you where you are in the process and status for each step.

- Custom Setup

Allows you to select the individual steps provided in “Guided Setup” and perform them in your order of preference. This menu is a subset of the tools available when you use the Toolbox. A progress bar at the bottom of the screen tells you where you are in the process and status for each step.

- Replication Setup

  Allows you to quickly clone the hardware configuration of one server to an identical server. Identical means the same model, same hardware options. You will need the “Replication Diskette” created during the setup and configuration of the original (source) server.

- Diskette Library

  Provides a complete library of NOS drivers, utilities, and supplemental software for your server.

- HP Server Management Solutions

  Lists and describes the additional management software available for your server and where to find it on the CD.

- Troubleshooting
- FAQ

  Frequently asked questions about using the HP Server tc4100 Navigator CD

- Diagnostic Diskette (Diagtools) Creation

  Diagnostic tool for your server.

- Support Web Page

  How to get additional support for your server via the web.

- Product Registration

  Register your HP Server tc4100 and find out about the additional services HP offers to help keep your server up and running.

Before the HP Navigator main menu is displayed, you may be prompted to set the language, time, and date. You can also set the language displayed by the BIOS. Refer to the following topics for more information on the Navigator CD-ROM's main menu items when run on the HP Server tc4100.

Obtaining HP Navigator CD-ROM Release Note

Check the release note to ensure you have the most recent firmware upgrades and software drivers for the HP Server tc4100.

To ensure you have the latest versions of the *HP Server tc4100 Navigator* software, obtain the current *HP Server tc4100 Navigator CD-ROM* Release Note. The Release Note is updated for each new release of the CD-ROM.

The Release Note briefly describes the following for each release:

- Major changes to the HP Navigator CD-ROM that were made for that release
- Version number
- Release date

You can read the Release Note for the *HP Server Navigator CD-ROM* via the What’s New Menu option. You can obtain the Release Note for all HP *Server Navigator CD-ROM*’s from the HP support website at:

http://www.hp.com

Obtaining Up-to-Date System Information

You can find up-to-date configuration information on the Navigator CD-ROM in the System Readme File. Use this source to learn about applicable compatibility issues and get the latest information for configuring your server.

Access the System Readme File First

This file includes the most recent information that was not included in the printed installation documentation. Follow these steps to view the file when booting from the CD.

1. Press the power-on button.
2. Press the CD-ROM drive eject button.
3. Place the *HP Server tc4100 Navigator CD-ROM* in the drive and press the eject button again to close the drive. The CD-ROM will start automatically, using the auto-run feature, as soon as the drive closes.
4. If the CD-ROM does not start automatically, push the reset button.
5. If the system fails to boot, follow the diagnostic instructions on the screen.
6. If the server boots the CD sucessfully, go to the HP Navigator main menu.
7. If the language needs to be changed, select **User Preferences** and the language you want. You can also change the language of the BIOS, but this is only available when in the BIOS Setup Utility.
8. Select System **Readme** and read it carefully before beginning your installation.

The System Readme file contains the latest information to help you install your HP Server tc4100.

Server Configuration Utility

The Configure the Server utility guides you through the steps necessary to configure the HP Server tc4100. You can view configuration advisories at one step and change your hardware if necessary.

Three methods of configuration are available: Guided , Custom, and Replication.

The HP Automated NOS Installation utility guides you through the NOS installation and configures the NOS with the appropriate drivers for the HP-bundled configuration. If Navigator detects that a newer version of the BIOS is available on the HP Navigator CD-ROM it will prompt you to update the BIOS.

Before you configure your server, you may need to run the Symbios Configuration utility and the Setup Utility to do the following:

- If you need to verify or modify SCSI host adapter settings.
- If you need to low-level format SCSI disks or verify SCSI disk media, run the Symbios Configuration utility.

Configuring the Server Using the Navigator CD-ROM

Power on the Server and Insert the *HP Server tc4100 Navigator CD-ROM* into the CD-ROM drive. If the system fails to start, follow the instructions on the screen.

1. You may need to set the language, time, and date when the HP Server tc4100 Navigator starts.
2. If so, follow the on-screen instructions.
   You can also change the language in which BIOS error messages are reported, but this is only available when in the Setup Utility (BIOS).
3. Go to the HP Server tc4100 Navigator main menu and select Configure the Server.
4. Follow the on-screen instructions to continue the Server Installation.

Guided Configuration

Guided configuration is the preferred method to configure your Server since it leads you through the configuration process in sequence and offers you default selections. Guided configuration includes the following steps:

1. **Tested Configurations (Optional)**
   Presents information that should be viewed before configuring your system:
   - **Configuration Advisor (Recommended)**
     Lists caveats and exceptions based on your system, hardware installed, and NOS selection.
   - **Tested Products List (Optional)**
     Lists hardware and software products tested with HP Server systems.
2. **BIOS and Firmware Update**
   Updates your server's BIOS code and firmware with the versions on the CD. This step will be automatically skipped if there are no mismatches between the BIOS on the system and on the CD.
3. **Disk Array Configuration**
   Allows you to run the disk array controllers (DAC) configuration utility. This step will be automatically skipped if there are no DAC's detected in the system.
4. **Remote Management Device Configuration (Optional)**
   Allows you to run the configuration utility for the Remote Management Device (RMD) in the system. This step will be automatically skipped if is are no RMD detected in the system.
5. **Diagtools Diskette Creation (Optional)**
   Takes you to the Diskette Library to create a Diagtools diskette.
6. **Save Configuration to Diskette (Optional)**
   Allows you to save the current hardware configuration on to a diskette which can be used to replicate the configuration on another HP Server.
   - Select NOS:

     You will be asked to select the NOS and version you plan to install.
   - Select NOS Installation Mode:

     For certain versions of Novell NetWare/IntranetWare and Microsoft Windows NT/2000 Server, you will be asked:

     ```
     Would you like to use HP's automated mode of NOS installation?
     ```

     o Select Yes for automated NOS installation.

     Perform an automated NOS installation for first-time installation of Novell NetWare/IntranetWare or Microsoft Windows NT/2000 Server on a factory-configured Server. Automated NOS installation will guide you through the NOS installation, set up the hard disk drive, and configure your NOS with appropriate drivers for HP-bundled configurations.

     This installation also loads Instant Toptools onto Widows NT/2000 or NetWare systems. Instant Toptools is a stand-alone support tool accessed directly from the server. It gives you information to help you manage the server.

     Automated NOS Installation: For certain versions of Novell NetWare/IntranetWare or Microsoft Windows NT/2000 Server, Configuration Assistant partitions and formats the hard disk drive, and Installation Assistant guides you through the NOS installation and configures the NOS with the appropriate drivers for the HP-bundled configuration.

     o Select No for manual NOS installation.

     Perform a manual NOS installation if you are installing a NOS other than certain versions of Novell NetWare/IntranetWare or Microsoft Windows NT Server, or if you have replaced any HP components.

For Manual NOS Installation *Only*: Before you perform a manual NOS installation, you must print instructions and manually create NOS-specific driver diskettes as follows:

- Create Drivers Diskette(s): On the Create Drivers Diskette(s) screen, select Create Drivers Diskette(s) to create one or more customized diskettes containing HP drivers and configuration files to use when you install the NOS.
- Print and Read Instructions: On the Show NOS Installation Instructions screen, select Save to Disk to copy the Network Operating System Installation Instructions to disk. Then print them out from the disk. Read the instructions first, and then follow them to manually install the NOS.

Custom Configuration

Only select Custom on the Configuration menu if you are experienced in Server configuration and have a preferred sequence of steps, or if you prefer to configure your system one component at a time. In Custom configuration mode, you perform the same configuration steps as provided in Guided configuration mode, but these can be done in any order.

After you have selected the NOS, version, and NOS installation mode (automated or manual), and after you have viewed the Configuration Advisories, the Custom Configuration screen displays the following menu:

Essential Steps

- Configure Disk Array:

  This configures your HP disk array, but requires you to fill out the Disk Array Configuration Worksheet, before proceeding. Click Help for more details.

- Execute Card Utilities:

  This executes the available configuration utilities for installed cards.

- Create Drivers Diskette(s):

  SCSI HP NetRaid Adapter and video adapter drivers for MS Windows NT 4.0 on HP Server tc4100s.

Recommended Steps

- Update System BIOS:

  This utility will update the system BIOS. The utility partition, if installed, will also be updated.

- Install Utility Partition:

  Installs utility partition to the boot or system drive. This is NOT available under SCO Unix.

- Show System Information:

  Shows hardware inventory and system resource (interrupts, I/O space) allocation.

- Show NOS Installation Instructions:

  Select this option to save a copy of NOS installation instructions to diskette and to print it out.

Replicate Configuration

In Replicate configuration mode, you can save a copy of your current system configuration or load a previously saved configuration. This method saves time when configuring multiple, identical systems. Select Replicate on the Configuration Assistant menu.

NOS Installation

The NOS installation process, whether automated or manual, is the same in custom configuration mode as in Express configuration mode:

- For Manual NOS Installation Only:

  Before you perform a manual NOS installation, you must manually create NOS-specific drivers diskettes and print instructions, as follows:

  - Create Drivers Diskette(s): On the Create Drivers Diskette(s) screen, select Create Drivers Diskette(s) to create one or more customized diskettes containing HP drivers and configuration files to use when you install the NOS.
  - Print and Read Instructions: You may already have done this directly from the Custom Configuration menu option Show NOS Instructions. If not, on the Show NOS Installation Instructions screen, select Save to Disk to copy the Network Operating System Installation Instructions to disk. Then print them out from the disk. Read the instructions first and then follow them to manually install the NOS.

- Install NOS:

  - Automated NOS Installation:

    For certain versions of Novell NetWare/IntranetWare or Microsoft Windows NT Server, Configuration Assistant partitions and formats the hard disk drive, and Installation Assistant guides you through the NOS installation and configures the NOS with the appropriate drivers for the HP-bundled configuration.

  - Manual NOS Installation:

    Follow the instructions on the screen and the Network Operating System Installation Instructions that you printed out.

HP Management Solutions

HP Management Solutions is a comprehensive suite of utilities, applications, and built-in features to manage multiple HP Servers locally or from remote locations. If you are unfamiliar with these products or concepts:

- Go to the Management Web site on the HP Web Site at:

  http://www.hp.com

  to view information on HP Toptools and all other HP Server tc4100 management options for your Server.

- Read the *HP Netserver/Server Management Reference Guide* included with your Server. This guide covers Toptools and all other HP Server tc4100 management utilities and options for the HP Server tc4100.

Toptools for Servers

HP Toptools for Servers is an online-reactive troubleshooting tool that displays the System Event Log (SEL) and gathers configuration information from the system. It also serves as the diagnostic engine for troubleshooting network servers through HP Instant Support.

Some of the features of Toptools include:

- Notification of problems with key hardware components including memory, disk drives, SCSI controllers, NICs, and power supplies, as well as environmental problems with temperature and voltage
- Unified event log to review a complete history of HP Server tc4100 activity in one place
- Predictive disk problem warning backed by HP pre-failure warranty replacement
- Disk capacity threshold alert and usage tracking
- Viewing of critical HP Server tc4100 inventory information such as the BIOS version, driver and firmware versions, PCI slot contents, and serial and parallel ports.
- Easy linkage with leading management platforms including HP OpenView Network Node Manager

- Support for DMI 2.0, which provides the same Desktop Management Interface inventory information for Servers as for desktop PCs

Toptools should be installed to help your service provider troubleshoot your system. Toptools is located on *HP Toptools CD-ROM* included with the system.

- See the *HP Server tc4100 Management Reference Guide* for detailed installation instructions.
- You can also download the Toptools software and documentation from the Server Web Site at:

  http://www.hp.com

HP Server Remote Management Card (Optional Accessory)

The Toptools for the HP Server Remote Management Card provides a management function for the HP Server tc4100. It enables remote LAN or modem-based server management and alerting through a pager or e-mail for improved remote administration of your Server.

Toptools Remote Control provides:

- Remote monitoring of critical HP Server tc4100 components, regardless of system state
- Access for troubleshooting and problem resolution, regardless of system state
- Pager or e-mail notification of critical HP Server tc4100 events to alert you to problems
- Access to the Event Log
- Server reset and power control
- Remote system BIOS or HP Server Remote Management Card
- Password and dial-back security
- Text console redirection of the HP Server tc4100 console
- Full graphics console redirection of Microsoft Windows NT Servers across the network or over a modem connection using Symantec's pcANYWHERE software (included with the system).

See the HP Server Remote Management Card User Guide for details.

PcANYWHERE

pcANYWHERE is a remote-control graphics-redirection software from Symantec Corporation that allows you to take control of Microsoft Windows NT Servers across the network or over a modem. Refer to the *HP Server tc4100 Online Documentation CD-ROM* for details, or the *HP Server Remote Management Card User Guide*.

ServerUtilities

HP Server tc4100 Utilities takes you to a menu where you can directly execute utilities such as the following:

- **Diagtools:** An easy-to-use hardware diagnostic for system verification, burn-in, and rapid troubleshooting.

NOTE	HP recommends using the HP Diagtools utility to verify all Server functions are operating correctly, after completing all the configuration topics. The HP Diagtools utility also generates a text file containing the hardware detected and the Diagtools test results. This text file, called a support ticket, should be saved to a diskette and used for future reference, especially by your support provider.

- **Event Log Report Utility**: Displays all logged HP Server tc4100 management events, Power-On Self Test (POST) errors and other system events (only if the HP Server Remote Management Card is installed).

- **Diskette Library**: Allows you to conveniently generate a flexible diskette for any utility or driver available on the *HP Server tc4100 Navigator CD-ROM*. For example, you can create flexible diskettes for the following utilities and drivers (such as: BIOS Update, HP Diagtools, and NOS Drivers).
- **Print or View Information:** Allows you to print or view the current system configuration including details of which boards are detected in the system and which resources are allocated to the boards.
- **Change User Preferences:** Lets you change the language used by the HP Navigator CD-ROM and the system date and time.

Setup Utility

The HP Server tc4100 has a Setup Utility (BIOS) in read-only memory. The utility features several system configuration and housekeeping options, including security, and system console characteristics.

The following sections describe how to access the Setup Utility and how to perform selected tasks.

Starting the Setup Utility

To reach the Setup Utility, boot or reboot the system. After the first boot messages are displayed, this prompt appears:

```
Press <F2> to enter SETUP
```

Press F2 while the prompt is displayed. More boot messages appear, followed by the message Entering Setup... After the embedded (Symbios) SCSI Configuration initialization and the Optional ROM scan both finish, the menu bar of the Setup Utility appears.

If you do not press F2, the HP Server tc4100 boots normally.

Menu Bar

The Setup Utility provides a menu bar that leads to several menus. The menu bar choices are:

- **Configuration** – Sets the system time and date and has the following menus:
  - Integrated I/O Port Settings – Use this menu to enable/disable and then set the base I/O address and IRQs of the serial ports, Serial A, and Serial B port and set the parallel port's parameters, including its mode (output only, bi-directional, or DMA channel).
  - PCI Device Settings – Use this menu to disable the Sharing Algorithm for each slot and manually set the IRQ for each PCI board installed into the six slots. This menu also includes setting the IRQ Locking feature for the embedded SCSI channels and the embedded LAN connection. Three more IRQs can be made available by disabling the Parallel, Serial A, and Serial B Ports.
  - Boot Settings – Use this menu to check the flexible disk drive, display the Server's configuration at boot time, skip certain tests during the boot process to speed up boot time, or change the (default) boot order, including device type, network boot, and hard drive boot order.
  - Embedded LAN & SCSI Settings – Use this menu to set the embedded NIC to enable, disable, or enable as a boot device (Boot ROM Enabled). If the embedded NIC is enabled as a boot device, boot ROMs for enabled SCSI devices cannot be loaded. This menu also enables/disables the Wake-On-LAN feature.
  - Keyboard & Mouse Settings – Use this menu to set the parameters of the keyboard, including NumLock, and set the PS/2 mouse to Auto (detect)/Enabled/Disabled. Disabling the mouse frees up IRQ 12, but prevents any installed PS/2 mouse from functioning.
  - Flexible Disk & IDE Settings – Use this menu to change the flexible disk type and IDE settings of the HP Server tc4100's configuration. This would include selecting the hard drive's characteristics, manually or automatically, and selecting which drive would be the Primary Master or Slave.
  - Processor/Memory Settings – Use this menu to select if the processor module's serial number (if supported) will be read by firmware, enables memory caching, and adds an extended memory gap in system address space.

- **Security** – Provides two submenus to choose from.
  - Power-On Password – Sets the administrator and user passwords, setting system to require a password after booting.

    The Administrator password must be set before setting the User password. Once the administrator password is set, the administrator can access and change all fields in the screens.

    If the User password is set, the user may only change the system time, date, and user password. The user may view all fields, but cannot alter any of the settings.
  - Hardware Security – Sets the system parameters for input device operation, including copying sensitive data and boot security.
- **Exit** – Exit the Setup Utility by saving changes or exit without saving changes, which reverts to previous settings.

  When you exit, the HP Server tc4100 reboots.

Using the Setup Screens

Online help explains the settings displayed on the Setup Utility screens. Instructions are also provided for navigating between the screens and entering or changing the setup data.

- Press the right-arrow and left-arrow keys to move between selections on the menu bar. The menu bar is present at the top of the main selections.
- Press the up-arrow and down-arrow keys to move between fields on each screen. The currently-selected field is highlighted.
- Certain fields ask you to choose from a list of entries. In such cases, press the plus (+) or minus (-) keys repeatedly to display each possible entry, or the Enter (or Return) key to choose from a pop-up menu.
- Small arrow points (➢) precede some field names. This means the field is actually a submenu. To visit the submenu, select it with the arrow keys and press the Enter key. The submenu then appears in place of the current screen.
- The Esc key is the exit key. If you press the Esc key on one of the top-level screens, the Exit menu appears. If you press Esc on a submenu, the previous screen appears. When you are making selections from a pop-up menu, use the Esc key to close the pop-up without making a selection.

Changing the System Date and Time

Use this topic to change the HP Server tc4100's date and time and refer to the following procedure.

1. To reach the Setup Utility, boot or reboot the system and press F2 when prompted.
2. If necessary, use the left-arrow key to select Configuration from the menu bar at the top of the screen.

   Once in the Setup Utility, the menu bar appears at the top of the screen with “Configuration, Security, and Exit” shown. The Configuration menu is the default menu and should be the highlighted selection at the left of the menu bar when the Setup Utility first opens.
3. If necessary, use the up-arrow key to move to the System Time field.

   The “System Time” field is highlighted by default when the “Configuration” menu is selected. This field actually consists of three sub-fields enclosed in brackets [xx:xx:xx]: hours to the left (24-hour clock), minutes in the middle, and seconds to the right.
4. Type in the hour and press Enter to move to the minutes field.
5. Then type in the minutes and press Enter again to move to the seconds field.
6. Type in the seconds and press Enter, then use the arrow keys to leave this field.
7. Scroll to System Date field to enter the system date in the field.

The dates are entered in the "System Date" field in the same way as the time is entered in the "System Time" field. This field also has three separate sub-fields for month, day, and year enclosed in brackets [xx/xx/xxxx].

8. Type in the month and press Enter to move to the day field.
9. Then type in the day and press Enter again to move to the year field.
10. Type in the year and press Enter, and then use the arrow keys to leave this field.
11. Use the right-arrow or left-arrow key to select the Exit menu.
12. Choose Exit Saving Changes from the list of exit options, then press Enter.
    A dialog appears and asks you to confirm your decision.
13. Choose Yes and then press Enter.

    The HP Server tc4100 reboots.

Setting the HP Server tc4100's Boot Passwords

Use this topic to set a password to boot the HP Server tc4100. You can have a separate administrator password and a user password, but the user password is limited in access once booted.

To configure the HP Server tc4100 for passwords and require a password on boot-up, refer to the following procedure.

1. If not already in the Setup Utility, boot or reboot the system and press F2 when prompted.
2. Use the right-arrow or left-arrow key to select Security from the menu bar.
   As soon as it is selected, the selections for the Security menu appear as shown below.
   - Power-On Password
   - Hardware Security

     The arrowhead > indicates there is a submenu to select from.
3. If necessary, use the arrow key to move to the Power-On Password menu selection and press Enter.
   The Power-On Password is highlighted by default when the Security menu is selected.
   The first line in the menu is, "Administrator Password is [Set or Not Set]"

- If no password has been set, then "Not Set" will appear in the field. If this is the case, then you are not allowed to make any other selections in this menu, until you set an Administrator Password.

  The Administrator Password controls access to the Setup Utility and its settings. The User Password has only limited access to the Setup Utility, such as Date, Time, and Password.
- If "Set" is in the field, then you can change the password or make other selections in the menu. However, you must start with the User Password, but may choose to skip setting the User Password.

NOTE You must set the Administrator Password before changing a User Password or configuring the HP Server tc4100 to boot with a password.

4. Press the Enter key to enter a new password or change the old one.
   A pop-up menu appears titled, "Set Power-On Password". If no password has been entered, the field "Enter New Password: [ ]" is highlighted. If a previous password has been entered, the field "Enter Old Password: [ ]" is highlighted.
5. Enter the password (new or old) in the appropriate field and press Enter.
   The password is accepted and the next field just below it, "Re-Enter New Password: [ ]" or "Enter New Password: [ ]" field is highlighted. For security reasons, the password does not appear on the screen.
6. If necessary, enter the new password in the "Enter New Password: [ ]" field.

7. Enter the new password again in the “Re-Enter New Password: [ ]” field.
   After re-entering the new password a pop-up menu displays asking you to confirm your selection.

NOTE To leave the pop-up menu without entering a password, press the Esc key at any time.

8. Choose Yes and then press the Enter key.
   The “Administrator Password is” field changes to “Set” and on the next boot the HP Server tc4100 will request a password to access the Setup Utility.
9. If you want a password on boot up, you may skip the “User Password is:”field and go directly to”Network Server Mode: [Disabled]” in Step 10.
10. If you want to enter a User Password, use the arrow keys to move to the “User Password is:” field and repeat Steps 3-7 for the User Password.
11. Use the arrow keys to move to the “Network Server Mode: [Disabled]” field.
12. Press Enter to toggle [Disabled] to “Enabled” in the Network Server Mode field.
    Setting this mode to Enabled will cause the HP Server tc4100 to prompt for a password when booting from a diskette or a CD-ROM, but will not require a password when booting from a hard drive. The power-switch and keyboard will remain locked until the password is typed.
13. To use the front panel keyboard lock button, use the arrow keys to move to the “Keyboard Lock [Disabled]” field.
14. Press Enter to toggle [Disabled] to “Enabled” in the Keyboard Lock [Disabled] field.
    Setting this feature enables the keyboard lock button on the front bezel of the HP Server tc4100. Once enabled, pressing the keyboard lock button will lock the keyboard and mouse until the password is typed. You must set the password before enabling this feature.
15. To use the Hardware Security menu under Security, use the help files provided with the selections.
16. Select the Esc key to exit this menu.
17. Use the right-arrow key to go to the Exit menu.
18. Choose Exit Saving Changes from the list of exit options, and then press Enter.
    A dialog appears and asks you to confirm your decision.
19. Choose Yes and then press the Enter key.
    Then the HP Server tc4100 reboots.
20. To change one of the passwords at a later date, return to the Security menu and repeat Steps 2 through 7 above for one or both passwords.

NOTE The HP Server tc4100 allows you to reset the password by toggling a switch, position 3, in the Configuration Switch Block on the System board.

Changing Internal Device Boot Priority

You can change the boot priority of the HP Server tc4100’s internal mass storage devices: the CD-ROM, the flexible disk drive (or other removable device), and hard drives connected to the HP Server tc4100’s internal SCSI ports.

1. Select “Boot Settings” from the Configuration menu, using the down-arrow or up-arrow key, and press Enter.

   A Boot Settings screen appears, very similar to the one below.

```
Floppy check:[Disabled]
Summary screen:[Enabled]
Quick Boot mode:[Enabled]
> Boot Device Priority
> Hard Drive Priority
```

2. Use the down-arrow key to move to the “Boot Device Priority” field.
3. Press Enter to change the order and a list appears very similar to the one below:

```
1. [CD-ROM]
2. [Flexible Disk]
3. [Hard Drive]
4. [Network Boot]
```

The list provides the current boot order of the internal device types, including a NIC in the HP Server tc4100 connected to a network with a boot prom. If the [Hard Drive] selection is moved to the top of the boot list, it will use the logical hard drive selected in Steps 5-6 to boot the system.

a. To change the order, use the up- and down-arrow keys to select one of the device types.

b. Use the plus (+) or minus (-) keys to move a device type up or down the list.

3. Press Esc to exit one level to the Boot Settings menu.
This moves you back one level to the Boot Settings list shown in Step 1 above.
4. To change the hard driver boot order, scroll to “Hard Drive Priority” and press Enter.
A hard drive (HD) boot list similar to the one below appears on screen depending on the hard drives and bootable cards (DAC or SCSI Disk Controller) boards installed. The system attempts to boot the NOS on the first hard disk drive (or DAC or SCSI board) found in this list. If no NOS is found, the system tries the next logical hard drive in the list until a NOS is found.

```
1. [Bootable Cards]
2. [#30 ID01 LUN0 HP     4.26GB A]
3. [#30 ID02 LUN0 HP     4.26GB A]
```

5. Use the plus (+) or minus (-) keys to move the desired hard drive (or DAC or SCSI board) to the top of the list.

- The HD boot list has a maximum capacity of eight (8) logical hard drives.
- If a bootable Disk Array Controller (DAC) or SCSI Disk Controller board is used, the board is seen as a single logical drive.
- If more than eight logical drives are connected to the HP Server tc4100, drives 9 and above (including the DAC or SCSI boards and the drives connected to each) will not be recognized by the Setup Utility.
- You will not be able to enter the Setup Utility to make changes to these logical drives (including DAC and SCSI boards) during the boot process.
- However, these logical hard drives (including DAC and SCSI boards) will be properly recognized and activated by the respective NOS.
- For more information about selection guidelines, refer to Information Assistant on the *HP Server tc4100 Online Documentation CD-ROM*.

6. Press Esc to exit the Hard Drive Priority menu.
7. Press Esc again to exit the Boot Settings menu.
8. Use the right-arrow key to select the Exit menu.
9. Choose “Exit Saving Changes” from the list of exit options, then press Enter.
A dialog appears asking you to confirm your decision.

10. Choose “Yes” and press Enter.
    Then the HP Server tc4100 reboots.

Clearing CMOS

The Setup Utility provides a method of clearing CMOS from within the Utility. You may alsoclear the CMOS of the configuration settings using the configuration switch on the system board.

Clearing CMOS via the Setup Utility

1. To clear CMOS from the BIOS Setup utility, press ***F11*** during server POST when prompted to “Press F2 to enter Setup”. This will provide advanced features in the Setup utility.
2. From the **Exit** menu, select “Clear system configuration”.
3. Press F10 to save and exit the utility.

Clearing CMOS via the System Board Switches

1. To clear CMOS configurations using the System Board switch, power down the HP Server tc4100 and open the side panel to gain access to the System Board.
2. On the system board, reset switch 4, on the configuration switch block, from Off (open) to On (closed). See *Figure 3-23* and *Table 3-3*.

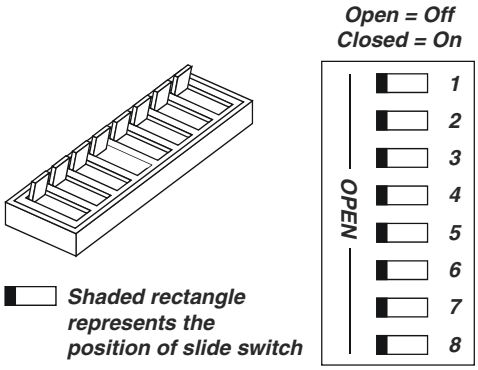


Figure 3-23. Configuration Switch Block - Clearing CMOS

Table 3-3. Configuration Switch Block

Switch Number	Switch On	Switch Off
1	Not Used	Not Used
2	Not Used	Not Used
3	Clear Password	Keep Password
4	Clear CMOS	Keep CMOS
5	Not Used	Not Used
6	Not Used	Not Used
7	Not Used	Not Used
8	Not Used	Not Used

3. Power up the HP Server tc4100.
4. When you see a message diaplayed indicating that the configurations have been cleared, power off the HP Server tc4100.

5. Return switch 4 from On (closed) to Off (open) on the system board's configuration switch block. See *Figure 3-23*.
6. Replace the side panel and power up the HP Server tc4100.
7. When you see the message "Incorrect System Configuration", press F2 to run the Setup utility.
8. Make any configuration changes required.
9. Choose the Exit option and save the changes you just made and exit the utility.

SCSI Configuration Utility

If you need to verify or modify SCSI host adapter settings, or if you need to low-level format SCSI disks or verify SCSI disk media, run the Symbios Configuration utility:

1. Turn on or reboot your system.
2. During system start-up or reset, when the following message appears, press the CTRL and C keys at the same time.

   ```
   Press [Ctrl] [C] to start Symbios Configuration Utility
   ```

3. Use the arrow keys to move the cursor, press Enter to select an option, and press Esc to exit.
4. To change adapter settings:
   - Select an adapter from the list in the main menu.
   - Select Adapter Setup. This option configures the SCSI ID setting and other advanced adapter settings.
5. To format a hard disk or change hard disk parameters:
   - Select an adapter from the list in the main menu.
   - Select Device Selections.
   - Select the hard disk to format.
   - Select the Format menu option.

For more information, refer to "Information Assistant" on the *HP Server tc4100 Online Documentation CD-ROM*.

Running the Navigator CD-ROM on a Windows PC

Using the HP Navigator CD-ROM in any Windows PC does not allow you to perform any configuration tasks, but it does allow you to view the configuration instructions before or after installing and setting up your HP Server tc4100. The Navigator CD-ROM will autorun on any PC with Windows 95®, Windows 98®, or Windows NT®.

Contents of the Navigator CD-ROM – Windows PC

The Main Menu provides you with options to view and print configuration information. The menu and submenu buttons are listed here with a brief description for each selection.

- What's New on the CD – This menu selection provides the part number and version of the CD as well as a status report about the systems supported by this CD. It also provides the Internet address for the latest information including release notes about your HP Server tc4100.
- System README – This file includes the most recent information that was not included in the printed installation documentation.
- Guide To Configure Server – This menu selection provides three submenus.
  - NOS Installation Instructions - This submenu selection provides you with the necessary instructions to install the NOS you have selected for this installation.

- Tested Configurations – This menu selection provides two submenus.
  - o Configuration Advisor – This submenu option provides you with important information about such items as driver version compatibility for various hardware and software items, such as NIC and LAN boards or NOS drivers, workarounds for known configuration problems, etc. which will help you complete your installation.
  - o Tested Products List – This submenu option provides you with a list of tested products for the HP Server tc4100.
- Diskette Library – This menu selection provides the same listing of Utilities for the tc4100 as the Diskette Library in the main menu. You may use this screen to create the required diskettes for "BIOS Update Diskette – tc4100," or utilities such as "HP Diagtools."

- Diskette Library – This menu selection provides the same listing of Utilities for the tc4100 as the Diskette Library submenu option under "Guide to Configure Server." You may use this screen to create the required diskettes for "BIOS Update Diskette – tc4100," or utilities such as "HP Diagtools." This menu selection is the same one offered by the Navigator CD-ROM if run on the HP Server tc4100.
- Troubleshooting – This menu selection provides three submenu items.
  - FAQ (Frequently Asked Questions) – This submenu covers the most often asked questions regarding your HP Server tc4100 and its installation.
  - Diagtools Diskette – This submenu helps you create the Diagtools Diskette.
  - Support Web Page – This submenu option takes you directly to the HP Support web page if your PC has an Internet connection and a browser. If not, it provides you with the current Internet address for HP Support.
- Product Registration - This menu selection opens the Internet connection for registering your HP Server tc4100 and its installation, if your PC has an Internet connection and a browser.
- HP Server tc4100 Management Solutions – This menu selection provides you with a comprehensive suite of utilities, applications, and built-in features to manage multiple HP Servers locally or from remote locations. This menu selection is the same one offered by the Navigator CD-ROM if run on the HP Server tc4100.

Up-to-Date Configuration Details

You can find up-to-date configuration information on the *HP Server tc4100Navigator CD-ROM*, in "What's New on the CD," in "System README," or in "Guide to Configure Server." Use these sources to learn about applicable compatibility issues and get the latest list of HP-tested peripherals and accessories. Refer to the Test Products List in Configuration Advisor.

These files include the most recent information that was not included in the printed installation documentation. Refer to following procedure to view these files.

1. Ensure the PC is powered on.
2. Press the CD-ROM drive eject button.
3. Place the *HP Server tc4100 Navigator CD-ROM* in the drive, and press the eject button again to close the drive.
   The CD-ROM will start automatically using the auto-run feature as soon as the drive closes.
4. If the CD-ROM does not start automatically, push the eject button on the CD drive and re-insert the CD-ROM.
5. The opening screen of the HP Navigator prompts you to select a HP Server model.
6. Select the HP Server tc4100 from the pull down list of Server models.
7. Press the Continue arrow icon at the bottom right of the screen.

   The next screen appears prompting you to select a NOS (Network Operating System).

8. Scroll down through the list of supported NOS and selected the NOS used with this installation.

   The HP Navigator main menu appears.

9. Scroll to “What's New on the CD” in the main menu and read it carefully before beginning your installation. You may also use the two icons to “Save to Diskette” or “Print” the information on screen.

10. Close the screen and scroll to “System README” and read it carefully or select to save or print it before beginning your installation.

    The System README file contains the latest information to help you install your HP Server tc4100.

11. Access the other Menu items as required, such as “Configuration Advisor” under “Guide to Configure Server.”

    The screens may display all or some of the following icons at the bottom of the screen.

    - Exit – This icon allow you to exit the HP Navigator Program.
    - Toolbox – This icon allows you to launch tools and utilities.
    - Overview – This icon allow you to view configuration details.
    - Help – This icon displays online help for the screen displayed or item selected.
    - Home – This icon allows you to return to the main menu from your present screen.
    - Back – This icon allows you to return to the previous screen.
    - Continue – This icon allows you to continue to the next screen or with the currently selected process.
    - Save to Diskette – This icon allows you to save the contents of the file displayed on screen.
    - Print – This icon allows you to print the contents of the file displayed on screen.
    - Close – This icon allows you to close the screen without taking any actions.

4 Error Messages

Power-On Self Test (POST) Error Codes

Error messages (POST Codes) are encountered if an error condition occurs during the boot process of the HP Server tc4100. All codes and their respective descriptions are listed in the following table; all the codes may not apply to your server.

These codes will appear on the display monitor, provided it and the supporting circuitry are functioning.

NOTE Do not take remove/replacement actions until you have taken other troubleshooting steps. See *"Preventive Maintenance" on page 83*.

Table 4-1. POST Error Codes

Code	Description	Problem/Solution
0000	System Board error	POST has detected a failure limited to the system board internal functions. To verify this error: 1. Reboot the server. Skipping this error message and continuing may result in unstable behavior, or a system hang during the boot process. 2. If this error continues, the system board may need to be replaced. Contact your service representative.
0010	BIOS problem	The PC configuration has been lost, cleared, corrupted, or has not been initialized. When the HP Server remains unplugged for a long period of time, the battery will discharge and not provide enough current to keep the CMOS memory powered. To correct this: 1. Verify the battery is properly inserted. 2. 2. If necessary, replace the battery as described in your user's guide. Run the Setup Utility to re-configure your server.
0011	Battery problem	The server BIOS is not responding due to a possible battery discharge. If the HP Server was unplugged for a long period of time, the battery will discharge and not provide enough current to keep the system date and time current. To correct this: 1. Verify the battery is properly inserted. 2. If necessary, replace the battery. 3. Set time and date using the Setup utility or from your operating system.
0012	BIOS initialization problem	The HP Server configuration has been cleared or has not been initialized. Run the Setup Utility to re-configure your system.
0050	Processor Cooling/ Heating problem	POST has detected a cooling fan problem.

Table 4-1. POST Error Codes

Code	Description	Problem/Solution
0100	Keyboard error during POST	A key on the keyboard has been pressed during POST of the HP Server. To correct this: 1. Ensure nothing is placed on the keyboard and no key is accidentally pressed down. 2. Reboot the server. 3. If the error persists, your keyboard may need to be replaced. Contact your service representative.
0101	Keyboard error	The keyboard has reported an error during its self-test. To correct this: 1. Restart your HP Server. 2. If the error persists, your keyboard may need to be replaced. Contact your service representative.
0102	Keyboard controller error	POST has detected a general failure in the integrated keyboard controller. To verify this error: 1. Restart your HP Server. 2. If the error persists, your keyboard may need to be replaced. Contact your service representative.
0103	Keyboard is not connected	POST has detected the keyboard is not connected. To correct this: 1. Verify the keyboard connector is firmly connected. 2. Reboot the server. 3. If the problem persists, your keyboard cable may be damaged or your keyboard may need to be replaced. Contact your service representative.
0105	Mouse boot error	The system board has detected a mouse error during POST. To correct this: 1. Clean the mouse and its moving ball as described in the User's Guide. 2. If the problem persists, your mouse may need to be replaced. Contact your service representative.
0106	Mouse is not responding	The system board has detected the mouse is not responding. To correct this: 1. If the mouse has just been removed, press Esc to automatically validate the change. 2. Otherwise, verify the mouse connector is firmly connected. 3. If the problem persists, your mouse may need to be replaced. Contact your service representative.
0108	Mouse and Keyboard connections reversed	POST has detected the mouse and keyboard connections are reversed. To correct this: 1. Turn the server off. 2. Swap the mouse and keyboard connections. 3. Turn on the server power and reboot the server.

Table 4-1. POST Error Codes

Code	Description	Problem/Solution
0200	Serial Port Controller resource conflict	POST has detected an address space or IRQ resource conflict between one of the integrated serial port controllers and an accessory board. To correct this: 1. If an integrated serial port is not needed, run the Setup Utility and disable the related serial port. 2. If the integrated serial port is needed and its settings cannot be modified, the accessory board's IRQ and address space must be reconfigured to use other free resources. Refer to the accessory board installation manual for information.
0201	Parallel Port Controller resource conflict	POST has detected an address space or IRQ resource conflict between the integrated parallel port controller and an accessory board. To correct this: 1. If the integrated parallel port is not needed, run the Setup Utility and disable the parallel port. 2. If the integrated parallel port is needed and its settings cannot be modified, the accessory board's IRQ and address space must be reconfigured to use other free resources. Refer to the accessory board installation manual for information.
0300	Flexible disk drive (A) boot error	POST has detected the flexible disk drive (A) reported an error during its self-test. To correct this: 1. Verify a diskette can be properly inserted and removed from the flexible disk drive. 2. Verify the flexible drive type configured in the Setup utility matches the flexible disk drive installed in the HP Server. 3. Verify all data cables and power cables are firmly connected. 4. If the problem persists, your flexible disk drive may need to be replaced. Contact your service representative.
0306	Flexible disk drive controller boot error	POST has detected a general failure on the integrated flexible disk controller. To verify this: 1. Restart your HP Server. 2. If the error persists, your system board may need to be replaced. Contact your service representative.
0307	Flexible disk drive controller resource conflict	POST has detected an address space or IRQ resources conflict between the integrated flexible disk controller and an accessory board. To correct this: 1. If the integrated flexible disk controller is not needed, run the Setup Utility and disable the flexible disk controller. 2. If the integrated flexible disk controller is needed, the accessory board's IRQ and address space must be reconfigured to use other free resources. Refer to the accessory board installation manual for information.

Table 4-1. POST Error Codes

Code	Description	Problem/Solution
0400	CD-ROM boot error	POST has detected the CD-ROM drive has reported an error during its self-test. To correct this: 1. If a CD-ROM disk is present, verify it is correctly inserted. 2. Verify the CD-ROM drive door or tray has not been opened or closed during the self-test. 3. Verify all data cables and power cables are firmly connected. 4. If the problem persists, your CD-ROM drive may need to be replaced. Contact your service representative.
0401	CD-ROM drive not responding	POST has detected the CD-ROM drive is not responding, but is configured in the Setup utility. To correct this: 1. If the CD-ROM drive has just been removed, press F4 to automatically validate the change. 2. Verify all data cables and power cables are firmly connected. 3. If the cable is damaged, connect the CD-ROM to another cable, if available. The Setup Utility and the 32-bit disk access driver may need to be modified accordingly. 4. If the problem persists, your CD-ROM drive may need to be replaced. Contact your service representative.
0500	Hard Disk (primary) controller boot error	POST has detected a general failure on the integrated (primary) hard disk controller. To correct this: 1. Restart your HP Server. 2. If the error persists, your system board may need to be replaced. Contact your service representative.
053X	Hard Disk drive connection problem (This does not apply to tc4100) (Error code #0530 is the primary channel cable IDE1 and #0531 is the secondary channel cable IDE2)	POST has detected a hard disk drive on the second (slave) position on the IDE cable, but no hard disk has been found on the first (master) position. To correct this: 1. If only one hard disk is connected on the cable, disconnect the hard drive and use the other connector to re-connect the hard drive into the first (master) position. 2. If two disks are connected on the cable, verify all data cables and power cables are firmly connected for both hard disk drives. 3. If the error message appears just after a hard disk drive installation, check for master/slave specific jumper configurations in the hard disk drive installation manual. 4. If the problem persists, the hard disk drive may need to be replaced. Contact your service representative.

Table 4-1. POST Error Codes

Code	Description	Problem/Solution
0540	Hard Disk Controller resource conflict	POST has detected an address space or IRQ resource conflict between the integrated hard disk controller and an accessory board. To correct this: 1. If the integrated hard disk controller is not needed, run the Setup Utility to disable it (primary or secondary). 2. If the integrated hard disk controller is needed, the accessory board's IRQ and address space must be reconfigured to use other free resources. Refer to the accessory board installation manual for information.
0600	Video Memory boot error (This does not apply to tc4100)	The video memory size detected during POST is smaller than previously detected. To correct this: 1. If you have changed your video adapter, press F4 to automatically validate the change. 2. If the problem persists, the system board may need to be replaced. Contact your service representative.
0700	DIMM size boot error	The system memory size detected during the POST is smaller than previously detected. One or several DIMMs are either disconnected, or have been replaced by smaller ones. To correct this: 1. If some main DIMMs have just been removed or replaced by smaller ones, press F4 to automatically validate the change. 2. If no DIMM has been removed or changed, ensure all DIMMs are properly inserted in the slots. 3. If the problem persists, one of DIMMs may need to be replaced. Contact your service representative.
0712	DIMM installation error	POST has detected an incorrectly installed DIMM or the failure of one or more DIMMs. To correct this: 1. If additional memory was just installed in your server, please verify the installation conforms to the description in the User's Guide. 2. If this error was reported when no additional memory was just installed, restart the server. 3. If the error persists, contact your service representative.
0713	Incorrect DIMM installed	POST has detected one or more DIMMs are not the correct type, or the correct speed. To correct this: 1. If additional memory was just installed in your server, please verify the correct DIMM type and speed for this server was installed. Refer to the DIMM description in “Memory Modules” in Chapter 3, “Installing TC4100.” 2. If this error was reported when no additional memory was just installed, restart the server. 3. If the error persists, contact your service representative.

Table 4-1. POST Error Codes

Code	Description	Problem/Solution
0800	Cache memory size error	POST has detected the cache memory size is smaller than previously detected. To correct this: 1. If the processor module has just been replaced, press F4 to automatically validate the change. 2. If the problem persists, the processor module may need to be replaced.
0801	Cache boot error	POST has detected an error in the cache memory module. To correct this: 1. Verify the processor module is installed correctly. Refer to “Memory Modules” in Chapter 3, “Installing TC4100 “ for handling precautions. 2. If the problem persists, the processor module may need to be replaced.
0900	Integrated LAN disable error	The system could not disable the integrated LAN. To correct this: 1. Reset the Integrated LAN by powering off the HP Server. 2. Disconnecting the power cord for 20 seconds. 3. Reconnect the power cord and power on the HP Server. 4. If the error appears upon restarting, update the system BIOS. 5. Insert the HP Navigator CD-ROM in the CD-ROM drive and power-cycle your system. This will initialize the flash utility on HP Navigator CD-ROM. 6. If the error persists, the system board may need to be replaced. Contact your service representative.
0901	Integrated LAN enable error	The system could not enable the integrated LAN. To correct this: 1. Reset the Integrated LAN by powering off the HP Server. 2. Disconnecting the power cord for 20 seconds. 3. Reconnect the power cord and power on the HP Server. 4. If the error appears upon restarting, update the system BIOS. 5. Insert the *HP Navigator CD-ROM* in the CD-ROM drive and power-cycle your system. This will initialize the flash utility on the *HP Navigator CD-ROM*. 6. If the error persists, the system board may need to be replaced. Contact your service representative.
0A00	Display refresh rate error	The parameters returned by the display do not match the DDC standard used by the server for automatic setup of ergonomic refresh rates. To correct this: 1. Disable the 'Plug & Play Display' feature in the Setup Utility to avoid a blank or unreadable screen at power-up. 2. Use the Setup Utility to manually set the video refresh rates to the highest ergonomic refresh rates supported by the display. Refer to display monitor's User's Guide for specifications.

Table 4-1. POST Error Codes

Code	Description	Problem/Solution
0B0x	Missing Microcode Update	Your system is missing the Microcode Update data block for the microprocessor. You must correct this problem in order to avoid possible malfunction or reliability problems. To correct this: 1. Update your BIOS by running the flash utility from your Navigator CD-ROM. To do this, insert the Navigator CD-ROM in the CD-ROM drive and power-cycle your system. 2. If updating your BIOS does not clear this error, contact your service representative.
0B1x	Failed to load Microcode Update	Your system has failed to load the Microcode Update data block for the microprocessor. You must correct this problem in order to avoid possible malfunction or reliability problems. To correct this: 1. Update your BIOS by running the flash utility from your Navigator CD-ROM. To do this, insert the Navigator CD-ROM in the CD-ROM drive and power-cycle your system. 2. If updating your BIOS does not clear this error, contact your service representative.
0B2x	Defective Microcode Update	The Microcode Update data block for the microprocessor is defective. To correct this: 1. Update your BIOS by running the flash utility from your Navigator CD-ROM. To do this, insert the Navigator CD-ROM in the CD-ROM drive and power-cycle your system. 2. If updating your BIOS does not clear this error, contact your service representative.
0B3x	Processor Module conflict	POST has detected the processor modules installed in the server are not the same type or speed. To correct this: 1. Ensure both processor modules in the server have the same product code, which should include the type, heat sink, and speed. 2. If not, replace one or both to ensure both are the same product code. This problem must be corrected to avoid possible malfunction or reliability problems.

Beep Codes

If the Bios detects a terminal error condition, it halts POST after issuing a terminal error beep code and it attempts to display the error code on the upper left corner of the screen. The following is a list of the beep codes issued for terminal errors.

Table 4-2. Beep Codes

Beeps	POST Routine Description
1-2-2-3	BIOS ROM checksum
1-3-1-1	Test DRAM refresh

Table 4-2. Beep Codes

Beeps	POST Routine Description
1-3-1-3	Test 8742 Keyboard Controller
1-3-4-1	RAM failure on address line xxxx*
1-3-4-3	RAM failure on data bits xxxx* of low byte of memory bus
2-1-2-3	Check ROM copyright notice
2-2-3-1	Test for unexpected interrupts
1-2	Search for ROMs. One long, two short beeps on checksum failure
1	One short beep before boot

*If the BIOS detects RAM error, it displays an additional word-bitmap (xxxx) indicating the address line or bits that failed.

5 Diagnostics

When the server boots, a series of tests are displayed on the screen. The number of tests displayed depends on the configuration of the server. The following are the kinds of errors a user might get with the HP Server.

- Built-in diagnostic error messages.
- BIOS and other error messages. These are errors detected by the system BIOS outside the built-in diagnostics or application errors.

To see the Power On Self-Tests (POST):

- The HP Server must be functionally able to run the diagnostics.
- The video subsystem must be functional.
- The keyboard must be functional.

NOTE	BIOS ROM version number is displayed on the monitor screen during power-up.

Power-On Self Test (POST)

The diagnostics Power-On Self Tests (POSTs) run automatically each time the server is powered on. These diagnostics, which reside in the BIOS ROM, isolate server-related logic failures and indicate the board or component that needs to be replaced, as indicated by the error messages. Most server hardware failures will be accurately isolated by the diagnostic.

WARNING	You should always turn off the power and disconnect the power cord(s) to the server before opening the HP Server tc 4100 and attempting to remove the cover and touching the internal components. Failing to do so can expose you to electric shock and the server's components to damage. The power switch does NOT turn off standby power, so disconnect the power cord(s) to turn off standby power.

There are two kinds of error messages that appear during the POST process and the causes of these messages may prevent the server from completing the boot process. These are:

- Messages in reverse video (black text on white background).

  Press the Return key to see a definition of the message and what action to take to remedy the problem.
- Power-on self test (POST) errors - These display in normal video (white text on black background) and may be a text message or an alpha-numeric code. If an error with a text message occurs during the POST, details of the error are displayed. Follow the instructions on the screen. If an alpha-numeric code appears, refer to the section “Power On Self Test (POST) Error Codes” later in this chapter.

No Error Messages Displayed

General Checks:

1. All external cables and power cords are firmly plugged in.
2. The power outlet is working.
3. The server and monitor are turned on. (The power-on indicator should be illuminated.)
4. The display’s contrast and brightness settings are correct.
5. All internal cables are properly connected and all boards firmly seated.

6. Verify that the processor and its heat sink are fully seated in its socket on the system board.
7. Verify that the memory is installed correctly and fully seated.
8. Verify the slots and tabs are aligned in the DIMM connector.

After Installing an Accessory:

1. Turn off the monitor, the server, and any external devices.
2. Unplug all power cords from the power outlet.
3. Open the side panel.
4. Check the following:
   - If you have installed an accessory board, verify that the board is firmly seated in its slot and any switches or jumpers on the accessory board are properly set.
   - Refer to the documentation provided with the accessory board.
   - Check all internal cabling and connections.
   - If you have changed any switches on the system board, verify that each one is properly set.
5. Close the side panel and connect all cables.
6. Turn on the monitor and server.
7. If the server still does not work:
   - Repeat steps 1, 2, and 3 of this section.
   - Remove all accessories, except the primary boot hard disk drive.
   - Close the side panel and connect all cables.
   - Turn on the monitor and the server.
   - If the server now works, replace the boards and accessories one at a time to determine which one is causing the problem.

POST Error Messages

If you get a POST text error message in reverse video, press Enter (View System Error) to get a more detailed explanation and a possible solution.

If the server starts, but POST still reports an error message, clear the CMOS configuration, as described later in this chapter.

NOTE	HP recommends you correct the error before proceeding, even if the server appears to start successfully.

Table 5-1 describes typical POST text errors and the corrective action you may take to remedy the problem.

Table 5-1. POST Error Messages

Message	Corrective Action
Operating system not found	• Verify that the desired boot drive has power and its SCSI cable is connected. • Verify that the SCSI cable is securely plugged into the SCSI connector on the system board. • Verify that the boot device is enabled in the Setup Utility under the Security menu. • Verify that the boot device has an operating system installed. If the problem persists, contact your HP support organization.
Keyboard error	Verify that the keyboard is connected to the correct connector (not the mouse connector) at the rear of the server. If the problem persists, replace the keyboard or contact your HP support organization.
Mouse error	Verify that the mouse is connected to the correct connector (not the keyboard connector) at the rear of the server. If the problem persists, replace the mouse or contact your HP support organization.
If no message appears (screen is blank)	• If no text or messages appear listen for the beep codes. Refer to the Service manual on the *HP Server Online Documentation CD-ROM.* • If no message appears but the server stops after POST, verify that the DIMMs are correctly installed.
If a configuration error occurs	If a server configuration error is reported during the startup routine, clear the CMOS memory as described under "Clearing the CMOS Configuration," and restart the server.
System CMOS checksum bad	• Press F2 to run Setup. • Change settings as required. • Choose the Exit option, selecting Save Changes and Exit to save the new settings. The server should reboot.

HP Server Diagtools

The purpose of hardware diagnostic software is to provide tools for checking hardware problems. By design, diagnostic software executes simple tests of each hardware component. Usually, such tests assure that hardware is not the source of server problems. This allows the user to eliminate hardware as the cause of the problem and to focus on operating system configuration parameters, network connections, and application software configuration parameters as the source of the problem.

If hardware problems are confirmed, the diagnostic software program can sometimes detect and diagnose the subsystem or specific server component causing the problem. In addition, diagnostic tools can capture information that allows support personnel to quickly assess the condition of the server.

In order to be effective, diagnostic software tools must be used in the context of a wider troubleshooting procedure.

Diagtools for HP Servers is a set of offline diagnostic tests, including tests for system and processor components, memory and storage elements, ports, and input/output devices. Diagtools is supplied on the *HP StartUp CD-ROM*.

The user prepares Diagtools software for use by transferring it to a diskette. Then the Diagtools diskette is used to boot the server. A basic suite of tools checks key server components, and a menu of advanced tests is available for in-depth testing.

Diagtools has the ability to test the following components:

- system board
- memory modules
- flexible disk drives
- parallel ports
- video monitor
- processors
- hard disk drives
- keyboards
- CD-ROM drives

Diagtools is an offline diagnostic. Offline diagnostics do not use the main operating system (OS) of the HP Server. The alternate Diagtools OS has far fewer features than the full-fledged OS. Thus, its capabilities are limited to a set of basic tests and a series of advanced tests. In addition, Diagtools does not use any tests which might write over and thus destroy user data. Tests that require user inputs or decisions are left to the advanced series of tests.

You can use Diagtools to perform the tasks listed below:

- Display a high-level inventory of the server under test
- Save and print a detailed inventory of hardware components
- Conduct a basic test of components listed in the server inventory
- Display “PASSED” or “FAILED” overall results of basic tests
- Record detailed test results of basic server tests
- Display a menu of advanced tests
- Select and run one or a series of advanced tests
- Add the record of results of advanced tests to the record of basic tests
- View a list to locate the meaning of a specific error code
- View one or more steps to help confirm and isolate error conditions
- Browse the support ticket, which contains the detailed inventories and test results
- Add comments to the support ticket

About Error Messages

A hexadecimal number designates each error message reported by Diagtools; a short note on the type of error; and a list of one or more steps the user can take in response. When you run a test, it exercises many aspects of the hardware, so the number of possible error messages exceeds 300. Most of these are encountered rarely, if ever.

Error codes can be viewed online from the Diagtools User menu within the advanced series of tests, or you can refer to Chapter 3 of the *HP Server Diagtools Error Reference and User Guide*.

Advantages and Limitations of Hardware Diagnostics

Offline diagnostic software is useful in making sure that hardware has been eliminated as the cause for possible server problems. Such diagnostic tools can easily be shipped with a server, and they are relatively easy to use.

Only experienced personnel knowledgeable of its limitations should use offline diagnostic software.

Some limitations are:

- Booting the server from the diagnostics diskette
- No access to operating system error logs, since the OS is not operating at the same time as the diagnostic tools
- Limited ability to test only a single component at a time
- Inability to indicate problems with wrongly configured servers or the network

HP Toptools

HP Instant Toptools for Servers is an online-reactive troubleshooting tool that displays the System Event Log (SEL) and gathers configuration information from the system. It also serves as the diagnostic engine for troubleshooting network servers through HP Instant Support.

Toptools provides vital information for the fastest troubleshooting and proactive management of your HP Servers. Processors, memory, storage, and NICs are a few examples of the components managed by Toptools.

Toptools is included with every HP Server and should be installed to help your service provider troubleshoot your HP Server. Toptools is located on the *HP Toptools CD-ROM*.

For sites with a single-server installation, you may not need the power of the web-based HP Toptools. Instead, *HP Toptools Auto Alert* and *HP Instant Toptools*, included on the *HP Server Navigator CD-ROM* can provide all the tools you need to manage your small business environment. HP Instant Toptools provides the same information as HP Toptools but is run directly at the server. HP Instant Toptools is automatically installed on your server when using the *HP Server Navigator CD* to install your Network Operating System. HP Toptools Auto Alert may be installed either from the *HP Toptools CD-ROM* or the *HP Server Navigator CD-ROM*.

- See the *HP Server Management Reference Guide* for detailed installation instructions.
- You can also download the Toptools software and documentation from the Toptools Web Site at:

  http://www.hp.com

Some of the features of Toptools include:

- Notification of problems with key hardware components, including memory, disk drives, SCSI controllers, and NICs
- Unified event log to review a complete history of server activity in one place
- Predictive disk problem warning backed by HP's pre-failure warranty replacement
- Disk capacity threshold alert and usage tracking
- View of critical server inventory information, such as the BIOS version, driver and firmware versions, PCI slot contents, and serial and parallel ports
- Easy linkage with leading management platforms, including HP OpenView Network Node Manager and computer Associates' Unicenter TNG and Tivoli products
- HP Toptools AutoAlert provides proactive warning of problems and advice on quick resolution through a friendly “traffic light” user interface
- Support for DMI 2.0, which provides the same Desktop Management Interface inventory information for servers as for desktop PCs

6 Troubleshooting

Preventive Maintenance

Refer to this table for preventive maintenance procedures for this HP Server tc4100. Be sure to turn off power to the HP Server tc4100 when cleaning it.

Table 6-1. Preventative Maintenance Procedures

Component	Time Frame	Maintenance Procedure
Keyboard	Regularly	Dust with a damp, lint-free cloth. Lock the keyboard if there is that option on the HP Server; otherwise, power off the HP Server before cleaning.
Monitor screen	Regularly	Use HP Video Screen Cleaner or other appropriate monitor screen cleaner.
Mouse	Regularly	The ring surrounding the trackball on the bottom of the mouse opens and closes. Remove the ring and keep the trackball free of dirt. Do not use solvent to clean. Use a damp, lint-free cloth.
Tape drive heads	Monthly	Use the recommended cleaning method noted in the device's manual.
Cooling fans and grilles	6 Months	Check functions of cooling fans and clean the intake openings on the chassis. Be sure to power off and unplug the HP Server before cleaning. Use an industrial static-free vacuum cleaner to remove the dust and lint.

CAUTION	Do NOT use petroleum-based cleaners (such as lighter fluid) or cleaners containing benzene, trichlorethylene, ammonia, dilute ammonia, or acetone. These chemicals could damage the keyboard's plastic surfaces.

HP recommends the periodic cleaning of tape drive heads, capstans, and guides on the HP tape drive units and those products using high-density data cartridges and mini-data cartridges. This maintenance procedure prolongs tape and head life and helps reduce read/write errors due to dust and oxide. Call the HP Customer Support Center or check HP's Storage website for further information for preventative maintenance information on the HP tape drive.

Troubleshooting Tools

If you are having problems installing your HP Server, there are a number of tools available for troubleshooting.

The HP Server Online Documentation CD-ROM contains the following tools:

- Troubleshooting Information
- Parts Information
- List of Error Messages
- List of Beep Code Error Messages

HP Server Navigator CD-ROM (only available for specific HP Server models) provides several utilities for troubleshooting purposes. At the Main Menu, select "Server Utilities" to use the following tools:

- Diskette Library - A collection of diskette images representing drivers, utilities, and BIOS updates, which enables you to conveniently generate any flexible disk available on the HP Server Navigator CD-ROM.

- HP DiagTools Utility - An easy-to-use hardware diagnostic for HP Server verification and rapid troubleshooting. Use this image to copy DiagTools to two (2) flexible diskettes from the HP Server Navigator CD-ROM.
- The Startup CD-ROM (only available for the HP Server tc2100 and tc2110) also provides the same DiagTools utility for troubleshooting purposes: Boot to the HP Startup CD-Rom on the HP Server and execute the utility. The HP DiagTools Utility will automatically launch.

Got to HP's web site at www.hp.com to access the most comprehensive support material.

- Latest support news – Product and support information on HP Servers.
- Drivers and software downloads for HP Servers.
- HP Instant Support – Fast, web-based support that is automated and provides quick diagnosis and resolution of most computing problems.
- Step-by-step guides and documents on the Instant Support site for system troubleshooting and information.
- Technical information – Data sheets, application notes, configuration guides, installation tips, product papers, reference material and more.
- Compatibility Information – HP Accessories, OS/NOS, HP and third-party products.
- Manuals – Easy installation and configuration manuals for the HP Server.
- Parts and Service – Information on replacement parts, exploded views, and configuration.
- Tape backup support – Support for HP's SureStore Tape Backup products.

Other Support Information

- HP Server Registration
- Training Programs – HP STAR worldwide training and certification program.
- Warranty and enhanced services – Your guide to services for your HP Server.
- Proactive Notification – HP will email your customer information when it is available.
- Contacts – How to get help or provide feedback.

If you need assistance, HP recommends contacting your reseller or going to the HP website first. Refer to the topics listed above. If you need immediate telephone assistance, contact the HP Customer Support Center by referring to the list of telephone numbers in the HP Server Warranty and Service/Support booklet provided with the HP Server.

Troubleshooting

WARNING	Before removing a cover, always disconnect the AC power cords. Disconnect them to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry. Disconnect the telephone cables to avoid exposure to shock hazard from the telephone ringing voltages.

WARNING	Do NOT operate the HP Server for more than 10 minutes with any cover (including power supplies and disk drives) removed. Otherwise, damage to system components may result due to improper cooling airflow. However, you can safely remove a cover while the HP Server is running to remove and replace PCI hot-plug boards. For any other service activity requiring access to the system board or power distribution board, power down the HP Server and observe all safety precautions.

- For problems with the HP NetRAID controller, refer to the appropriate HP NetRAID manuals.
- For general information on management products and for problems with HP Toptools, refer to the HP Web Site at:

  http://www.hp.com/toptools

- For general information on HP Server products, refer to:

www.hp.com and search for the specific product. These instructions do not generally cover third-party components or devices. Refer to the documentation that comes with the third-party device for diagnostic and troubleshooting information.

CAUTION	Always wear an antistatic wrist guard when working inside the HP Server.

- Ensure the HP Server is properly configured. Many HP Server problems are the result of incorrect system and SCSI subsystem configuration settings.
- Check the system BIOS Setup Utility by pressing F2 during the boot process.
- Check the SCSI configuration or the disk array configuration by entering the controller's setup utility.
- Boot to the HP Server Navigator CD or Startup CD for access to configuration tools to help setup the HP Server.
- If it is a network-related error, determine if the user has enough memory and hard disk drive capacity. Run the diagnostics for the NIC. Consult with the network operating system manual.
- If it is a hardware error, follow the instructions to log users off the LAN and power down the HP Server. Reboot and watch for any POST error messages and listen for any beep codes as the HP Server goes through POST then look up the error message in Chapter 5 of this Service manual. If the HP Server passes POST, the HP DiagTools Utility can be used to further test the hardware.
- Use HP DiagTools Utility whenever possible to detect hardware problems. Insert the HP Startup CD-ROM into the CD-ROM drive and reboot the HP Server. Run HP DiagTools from the Startup CD-ROM and verify the Server's hardware integrity.

Besides HP Server DiagTools, use the standard set of tools recommended for troubleshooting:

- HP Toptools provides a set of web-based management tools that can be used to manage your HP Servers from a client browser.

- HP Instant Toptools provides a set of web-based management tools that are used at the server to maintain and control the server. HP Instant Toptools may be run on tc4100 servers running Microsoft Windows 2000, Novell NetWare/IntranetWare, or SCO UNIX.

Troubleshooting Checklist

1. Verify the error. Make sure it is not an erroneous error message. Is the error repeatable? Is the error message seen affecting the HP Server's operation or performance?
2. Always change only one component at a time.
3. Always check the most recently added items added, both hardware and software. Remove any third-party components.
4. Make sure the HP Server BIOS is updated to the latest version posted to HP's external website. Flashing/ updating the system BIOS and clearing CMOS will resolve many different issues.
5. Make sure the firmware for the hard drives are kept current. Download and run the Hard Disk Drive Firmware Utility to verify if hard drive firmwares need to be updated. This utility is available from HP's external website.
6. Make sure all firmware/BIOS revisions on any controllers are kept current.
7. Use only HP-provided drivers for any HP devices used in the HP Server. This includes using HP drivers for the initial installation of any NOS (Network Operating System) that is supported on the specific HP Server.
8. Check all cable and power connections, including those in the rack. If the HP Server is not powering on, unplug the AC power cords and wait 20 seconds then plug the AC power cords in again and restart the HP Server. Check for normal operation.
9. Verify that all cables and boards are securely plugged into their appropriate connectors and slots.

If the problem still persists:

10. Simplify the HP Server's configuration. The minimum required:
    - Monitor
    - Keyboard
    - Mouse
    - 1 hard drive (may need to disconnect for hardware troubleshooting)
    - CD-ROM and Flexible disk drive (may need to disconnect for hardware troubleshooting)
11. Reconnect the power cords and power on the HP Server. If operational, power back down and reinstall one component at a time and power on the HP Server after the installation of each component to try and determine which component is causing the problem.

If the problem persists, call the HP Customer Support Center for further troubleshooting assistance.

BIOS Reset/Update/Recovery

Should you experience compatibility or stability issues with the HP Server, HP recommends starting the troubleshooting by first updating the system BIOS, which may fix the current problem. If the BIOS has become corrupt, it is possible to perform a BIOS reset, recovery, or update to correct the condition. A BIOS update/ recovery diskette is created when the most current BIOS is downloaded from the HP Web site to be used in flashing the BIOS on the server. To perform a reset, an update, or a BIOS recovery, perform one of the following procedures.

BIOS Reset

If the HP Server needs the BIOS settings set to the factory defaults (the HP recommended values) due to possible corruption, perform the following steps. The default values have been selected to optimize the HP Server's performance.

NOTE	It is recommended that the system's setup and configuration settings be noted before resetting the system to the defaults in the BIOS Setup Utility.

1. Reboot the HP Server in a normal manner and press <F2> to enter the BIOS Setup Utility.
2. Press <F9> to load default values.
3. Press <F10> to save changes and exit the BIOS Setup Utility.

BIOS Update/Recovery

Use this procedure to update the HP Server system BIOS with the latest BIOS version. HP regularly posts a new version of the HP Server BIOS on the website to improve the HP Server's performance.

1. Provide a blank, formatted 3 ½" floppy disk.
2. Insert this diskette to any Windows PC with HTML browser and a connection to the Internet.

   http://www.hp.com
3. Locate and download the latest HP Server BIOS to the PC's hard drive. Find the file that was downloaded and double-click on the file and follow the instructions to extract the file to the floppy disk. This downloaded BIOS on the diskette becomes the BIOS update diskette.
4. Boot the HP Server with the BIOS update diskette in the flexible disk drive. The BIOS Utility Update program will start and you will be prompted to update the system BIOS.
5. After the BIOS update is complete, remove the BIOS update diskette and then reboot the HP Server.
6. Press <F2> to enter the BIOS Setup Utility and make the necessary changes needed in the BIOS Setup Utility, press <F10> to save the changes and exit the utility.
7. Label, date, and save this flexible diskette for use as a BIOS Recovery diskette.

NOTE	If you do not have convenient access to the Internet, you can create a BIOS Update/ Recovery diskette from the *HP Navigator CD-ROM or the HP Startup CD-ROM*. Please note that these CD-ROMS may not provide the most recent BIOS. To create the BIOS Update/Recovery diskette, run the *Navigator or Startup CD-ROM* on any Windows PC with an HTML browser and follow the menu instructions.

Clearing the BIOS Configuration

NOTE	It is recommended that the system's setup and configuration settings be noted before clearing the BIOS configuration as this will reset all settings back to the default.

You may need to clear the BIOS (CMOS) configuration if the configuration has become corrupt or if incorrect settings made in the Setup Utility have caused error messages to be unreadable.

To clear the configuration:

1. Turn off power to the HP server and open the side panel.

2. Move switch 4 in the configuration switch on the system board (labeled "Clear CMOS") to the ON position.

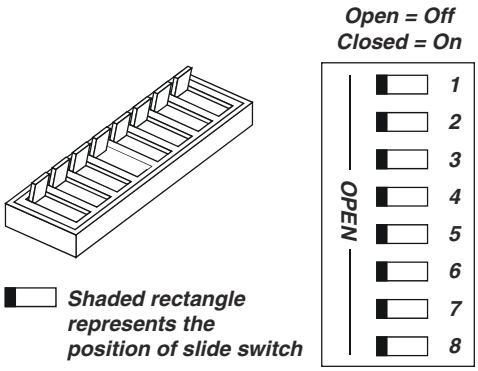


Figure 6-1. Configuration Switch Settings

Table 6-2. Configuration Switch Block

Switch Number	Switch On	Switch Off
1	Not Used	Not Used
2	Not Used	Not Used
3	Clear Password	Keep Password
4	Clear CMOS	Keep CMOS
5	Not Used	Not Used
6	Not Used	Not Used
7	Not Used	Not Used
8	Not Used	Not Used

3. Turn on the power to the HP server. A message displays indicating the configuration has been cleared.
4. Turn off power to the HP Server.
5. Return switch 4 on the system board to the **OFF** position.
6. Close the side panel.
7. Turn on the power to the HP server and the following message displays:

   ```
   Incorrect System Configuration
   ```

8. Press F2 to run the BIOS Setup Utility.
9. Make any configuration changes required.
10. Choose the Exit option and save the changes to save the configuration and exit the Setup Utility.

Password Problems

The only way to resolve the issue of a forgotten Supervisor password is to clear the password by using the appropriate dipswitch on the system board. Refer to the appropriate HP Server Operation and Maintenance Guide for the location of the password dipswitch.

Supervisor Password

1. Power off the HP Server. Remove the covers and locate the password dipswitch and move to the opposite position.

2. Power on the HP Server. When the memory count appears on the screen, power off the HP Server.
3. Move the password dipswitch back to the original position.
4. Power on the HP Server. The system BIOS Setup Utility will allow access to it now without having to enter any password.
5. A new Supervisor password can now be set from the system BIOS Setup Utility.

User Password

If you need to reset the User password and you know the Administrator password, perform the following steps:

1. Restart the HP Server.
2. During the boot process, press F2 to start the system BIOS Setup Utility.
3. Enter the Administrator password and once in the Setup Utility, go to the Security menu.
4. Scroll to the User Password field, and press ENTER on SET USER PASSWORD.
5. Enter the Administrator password as the old/current password and press ENTER.
6. Enter the new User password and press ENTER.
7. Reconfirm the new User password and press ENTER. This sets a new User password.
8. Exit out of the Setup Utility and save the changes to save the new password.

NOTE	If you have forgotten the Supervisor or the User, your HP Server will function normally, but you will not be able to access the system BIOS Setup Utility until the password dipswitch is moved and reset.

“Operating System Not Found” Message Appears

1. Check for a non-bootable diskette in the flexible disk drive. If found, remove the diskette from the disk drive.
2. Check for a tape in the tape drive. If found, remove the tape cartridge from the drive.
3. Power on the HP Server. If the message still appears, reboot the HP Server and when prompted, enter the system BIOS Setup Utility and check that the device boot order is correct.
4. If a disk array controller is being used and the NOS is installed on a hardware array/container, verify that the array/container is in an optimal state by accessing and checking the disk array controller’s setup utility during startup.
5. Boot to a DOS boot disk and check the partitions to make sure the primary partition is active.

If the problem persists, contact the HP Customer Support Center for further troubleshooting assistance.

Server Stops or Hangs While Starting Up

Typically, if the HP Server hangs before the end of POST completes, the problem is possibly a hardware problem or failure. If the HP Server hangs after POST completes, the problem is possibly due to an incorrectly configured or corrupt driver, operating system, application program, or a media (disk drive) error.

If the HP Server stops working or hangs starting up:

1. Review the Troubleshooting Checklist at the beginning of the chapter before continuing.
2. Try to verify exactly where the HP Server is stopping during POST. For example: is the HP Server stopping at the memory count or on a SCSI controller? Look for any error messages and listen for any beep codes and make note of them for further assistance in troubleshooting the problem.

3. If the failure persists, verify there is not a hardware problem by running HP DiagTools.

If the problem persists, contact the HP Customer Support Center for further troubleshooting assistance.

Power Problems

NOTE	The installation of the HP Server Remote Management Card (optional accessory) changes the Power Supply Status LED behavior on the front panel. See Chapter 1 Front Panel LED Indicators in this manual.

NOTE	The HP Server tc4100 supports the ACPI (Advanced Configuration and Power Management Interface) standard, which is a key component of a NOS's directed power management. The supported features are only available when an ACPI-compliant NOS is installed on the Server. . A blinking green power LED indicates the HP Server tc4100 is in a sleep mode. Refer to Chapter 1 in this manual BEFORE further troubleshooting to verify that the HP Server tc4100 is not in a sleep mode.

1. Verify the HP Server's power cord is plugged in to a known good power source.
2. Is the On/Off/Sleep LED on the front of the HP Server tc4100 a steady green, which indicts it is getting power?
3. Check the power supply LEDs on the power supply and verify that it is lit a steady green.
4. Remove the HP Server form any UPS or PDU and connect the HP Server directly to a power source.
5. Verify the AC power source is good:
   a. Verify the circuit breaker for the AC power outlet.
   b. If the breaker was off, verify all devices connected to the HP Server share the same circuit breaker and are the only devices on it.
   c. Reset the circuit breaker after reconfiguring the devices if needed.
   d. Verify the AC power outlet is not faulty by plugging in a known good device.
   e. Verify the DC power supply cable connected to the system board.
6. If the fans (system, power supply, and processor heat sink) are not audible and the above steps are verified:
   a. Disconnect the power cord/s for five minutes in order to reset the power supply's circuitry.
   b. With the power cord/s disconnected, remove the HP Server cover.

CAUTION	Always wear an anti-static wrist guard when working inside the HP Server.

   c. Remove all the accessory boards, including any hard disk drive controller board or video board. Disconnect all mass storage power cords and cables.
   d. Plug the power cord/s back in and turn on the HP Server.
   e. If power is still not getting to the HP Server, the power supply may be faulty.

Contact the HP Customer Support Center for further assistance before replacing any parts.

Video or Monitor Problems

NOTE The HP Server tc4100 supports the ACPI (Advanced Configuration and Power Management Interface) standard, which is a key component of a NOS's directed power management. The supported features are only available when an ACPI-compliant NOS is installed on the Server.

A blinking green power LED indicates the HP Server tc4100 is in a sleep mode. Refer to Chapter 1 in this manual BEFORE further troubleshooting to verify that the HP Server tc4100 is not in a sleep mode.

These are basic guidelines for troubleshooting video issues. They are arranged in such an order as to be used progressively. The HP Server should not be re-populated with components until video is produced. For each step taken, be certain to unplug the power for 30-60 seconds prior to powering the HP Server back on. For each power up attempt, allow at least 60 seconds for the HP Server to produce video.

NOTE Take appropriate electrostatic discharge precautions prior to working inside the HP Server.

NOTE If using a third-party video controller card and the onboard video controller (if applicable) was disabled, remove this controller card, connect the cable to the onboard video controller then clear the CMOS. This re-enables the onboard video. For instructions on clearing CMOS, refer to the section on this earlier in this chapter.

1. Test the monitor on another machine to verify the monitor is not faulty.
2. Disconnect the HP Server from any console switch box during troubleshooting. Connect a known good monitor, keyboard, and mouse to the HP Server to troubleshoot.
3. Verify that the AC power source is good. If suspect, try another power source.

NOTE Verify that fans and hard drives are spinning up. If no fans or drives are spinning up, see previous section on Power Problems.

If there is still no video:

4. Power off the HP Server and unplug from the power source and remove the covers.
5. Locate and toggle the “CLEAR CONFIG” switch to the “ON” position.
6. At the same time, check the processor speed switches to verify that they are set correctly.
7. Plug the HP Server into a power source and power on the HP Server. Quite often, just toggling the “CLEAR CONFIG” switch will restore video.

If there is still no video:

8. Power off the HP Server and unplug form the power source.
9. Remove all PCI controller cards.
10. Disconnect power and SCSI connections from tape drives and hard drives.
11. Disconnect IDE and flexible disk drive cables.
12. Take the HP Server down to base memory (1 DIMM) and reseat that DIMM.

13. Plug the HP Server into a known good power source and power on the HP Server.
14. If video returns, reinstall the removed components one at a time back into the HP Server. One of the removed components may have been causing the no video problem.
15. After all the components are reinstalled, reset the HP Server's BIOS configuration switch back to the appropriate setting.

If the problem persists, contact the HP Customer Support Center for further troubleshooting assistance before replacing any parts.

Configuration Problems

The Configuration Cannot Be Saved and the Battery Loses Power or the Configuration Information is Frequently Lost

WARNING	There is a danger of explosion if the battery is incorrectly installed. For your safety, never attempt to recharge, disassemble, or burn the old battery. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

NOTE	Configuration information is saved in the CMOS on the system board. The CMOS battery is the power source that saves this information.

1. If the HP Server frequently loses the time and date, clear the CMOS and flash the system BIOS to the latest revision. See the previous section in this chapter for Clearing the BIOS configuration and updating the system BIOS.
   - After performing the BIOS flash, on reboot, enter the BIOS Setup Utility (<F2> during POST when prompted) and set the date and time.
   - Exit out of the BIOS Setup Utility making sure to save changes before exiting.
   - See if this resolves the issue.
2. If this does not resolve the issue, boot to the Navigator CD and set the date and time from the appropriate menu. See if this resolves the issue.
3. If this does not resolve the issue, replace the CMOS battery. The battery is attached to the system board.
   - Turn off AC power to the HP Server.
   - Unplug the HP Server's power cords from the power source.
   - Remove the covers and locate the CMOS battery on the system board and replace the battery.
   - Power on the HP Server, and set the date and time from the BIOS Setup Utility (<F2> during POST when prompted).
   - Exit out of the BIOS Setup Utility, making sure to save changes before exiting.

On reboot, see if the issue is resolved with the good battery in the HP Server. If this still does not resolve the issue, please contact the HP Customer Support Center for further troubleshooting assistance before replacing any parts.

Printer Problems

If the printer does not work, do the following:

1. Verify that the AC power cord is plugged into the power source and the printer.

2. Ensure the printer power switch is ON and the AC outlet is working.
3. If the printer is plugged into a multiple-outlet box, make sure the switch on the outlet box is turned on and the circuit breaker (if applicable) is not tripped.
4. Ensure the printer is online and available for printing.
5. Verify the correct cables are being used and that the cables are connected properly. Make sure the cable pins are not bent.
6. Try a known good cable.
7. If the printer's parallel date cable is plugged into the HP Server after the server is on, reboot the HP Server.
8. Examine the printer for a paper jam.
9. Run the printer self-test. Refer to the printer's manual for instructions.
10. Ensure the correct port setting when configuring the printer.
11. Run the system BIOS Setup Utility (<F2> on POST when prompted) to verify the I/O port status. Make sure it is not disabled.)
12. Test another peripheral from the HP Server's parallel port to ensure functionality.

If the printer still does not work, contact the HP Customer Support Center for further assistance.

Keyboard Problems

NOTE	Use only an HP-Approved Keyboard as others may not work correctly.

If the keyboard does not work or a character is not displayed when a key is pressed:

1. Ensure that the keyboard is not locked, if the HP Server has this feature.
2. Ensure that the keyboard cable connections at the rear of the HP Server and at the back of the keyboard are secure.

NOTE	Use only an HP-Approved Keyboard as others may not work correctly.

3. If the KVM switchbox is used with this HP Server, remove the keyboard and plug the keyboard directly into the keyboard port of the HP Server.
4. Try replacing the keyboard with a known good keyboard, and then reboot the HP Server.
5. If there is a keyboard extender cable, make sure the connection is secure or remove the extender and plug the keyboard directly into the HP Server.

If the problem persists, contact the HP Customer Support Center for more troubleshooting steps before replacing any parts.

Mouse Problems

The HP Server automatically detects a mouse when one is installed. If the mouse or other input device is not working, check the following:

1. Verify that the mouse cable is properly and securely connected to the HP Server or KVM switch box.

2. If a KVM switch box is used with this HP Server, remove the mouse and plug the mouse directly into the mouse port on the HP Server..

NOTE	Make sure the mouse is plugged into the mouse port and not the keyboard port.

3. Ensure that the mouse port does not have a resource conflict with another device. Use the system BIOS Setup Utility (F2) to check.
4. Ensure that the correct mouse driver has been installed onto the boot drive. Refer to the mouse installation manual or the operating system manual.
5. Replace the mouse with a known good mouse.

If the problem persists, the system board may need to be replaced. Contact the HP Customer Support Center for further troubleshooting assistance before replacing any parts.

Floppy Disk Drive Problems

If the HP Server cannot boot from, write to, or format a flexible disk, do the following:

1. Try booting from a known good flexible disk.
2. If there is a bootable CD in the CD-ROM drive, remove it. By default, the CD-ROM drive is first in the boot order, so if there is a CD-ROM disk in the drive, the HP Server will not boot to a bootable flexible disk.
3. Select the system BIOS Setup Utility (<F2> on POST when prompted) and verify the mass storage configuration is correct.

NOTE	If for some reason the system BIOS Setup Utility cannot be accessed, clear the CMOS. See Clearing BIOS Configuration previously in this chapter.

4. Ensure the disk is not write-protected.
5. Ensure that the disk drive is trying to be accessed. Look for an activity light on the drive.
6. Try another flexible disk.
7. Boot to the HP Navigator CD and try creating a disk form the Diskette Library. This will eliminate the NOS causing the problem since the Navigator is only using DOS.

Flexible Disk Drive Problems

1. Verify that the internal drive cables are securely attached and functional by inspecting the cables and reseating the connections at both ends.
2. If the cables are securely attached and the drive still does not work, replace the cable with a known good cable.

If the problem persists, call the HP Customer Support Center for further assistance before replacing any parts.

CD-ROM Drive Problems

The CD-ROM drawer will not open

If the CD-ROM drawer fails to open when you press the Eject Button or with software commands, do the following:

1. Turn off all power to the HP Server tc4100.

2. To open the drawer, insert a pointed object, such as a paper clip, into the emergency eject hole and push in about 1.75 inches (40 mm).

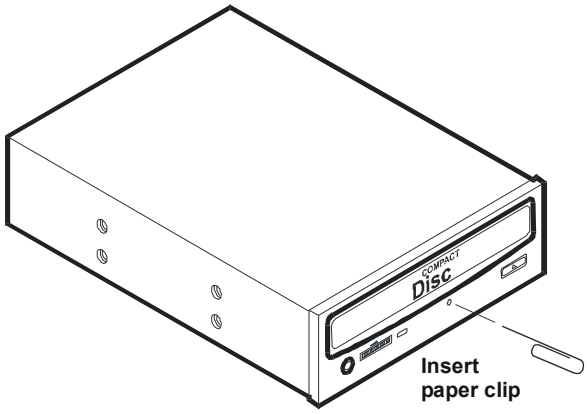


Figure 6-2. Opening the CD-ROM Drawer

3. Remove the disk and close the drawer.
4. After you remove the disk, start the HP Server tc4100 and try to open the drawer again with the Eject Button or software commands.

If the drawer still will not open, call HP Customer Support for further assistance before replacing any parts.

The CD-ROM drive is not working properly

The CD-ROM drive provided with certain HP Server models may be a SCSI device; while others are IDE devices. If the CD-ROM drive does not work, do the following:

1. Review the basic SCSI installation guidelines to ensure a proper configuration.
2. In addition, check the following:
   a. Verify that correct drivers are installed.
   b. Verify that a CD-ROM disk is in the CD-ROM drive.
   c. Verify that all internal drive cables are securely attached and functional.
3. Verify that the Local Bus IDE Adapter item is correctly configured in the Setup program:
4. Power on the HP Server and press F2 to enter the BIOS Setup Utility when this option displays.
5. Check that **Both** is selected in the Local Bus IDE Adapter field.

If the problem persists, contact the HP Customer Support Center for further troubleshooting steps before replacing any parts.

Environmental problems result from:

- Radiated Interference: Sources include communications and radar installations, radio/TV broadcast transmitters, and hand-held receivers.
- Airborne Contaminants: Sources include dust, smoke, and ashes. Steam from duplication equipment may result in intermittent disk errors.

The Server will not boot from a bootable CD

1. Verify the CD-ROM disk is bootable.
2. Use the BIOS Setup Utility to verify that the CD-ROM Drive is first in the boot order. To do this:
   - Reboot the server and run the (BIOS) Setup Utility (pressing F2).

- Scroll to the Boot menu.
- If necessary, move the CD-ROM up in the boot order list. This ensures the CD-ROM will boot before any of the hard disk drives (IDE or SCSI).
- Save and exit the Setup Utility.

If the problems persists, contact the HP Customer Support Center for further troubleshooting assistance.

SCSI Problems

The SCSI Boot Controller BIOS Has Trouble Loading The Boot Logical Drive (NOS drive)

1. Verify the SCSI boot controller is bannering (displaying) on POST.
2. Ensure that the SCSI boot controller's BIOS is enabled. Check this from the SCSI Setup Utility. To access this utility, enter CTRL C when a Symbios controller banners on POST or CTRL A when an Adaptec controller banners on POST.
3. Determine what the boot order is for the HP Server. To verify that the SCSI boot controller board is in the correct position in the boot order, enter F2 on POST to access the system BIOS Setup Utility. The boot order can be viewed and changed from this utility. If necessary, change the slot (if applicable) that the SCSI controller is in to change the location in the boot order.
4. If the problem persists:
   a. Clear CMOS and flash the system BIOS. See instructions previously in this chapter on the proper procedure to do this.
   b. Repeat step 3.
5. If you installed more than one SCSI controller, try disabling the BIOS on all other SCSI controller except for the SCSI boot controller. This lets the SCSI BIOS for the boot controller load and prevents conflicts with other SCSI controllers. If necessary, remove all the other SCSI controller boards except the SCSI boot controller until the issue is resolved.

Contact the HP Customer Support Center for further troubleshooting assistance.

A SCSI Controller Does Not Work At Initial Installation

Many SCSI controller problems are caused by an incorrect configuration rather than by faulty hardware. If the SCSI controller does not work after installation, do the following:

1. Verify the SCSI controller BIOS is bannering (displaying) on POST.
2. If more than one SCSI controller was installed, verify that each adapter is set to a separate BIOS address or disable the BIOS on all of the other adapters except the boot controller.
3. Make sure there are no resource conflicts.
4. For each device on the SCSI controller, check:
   - Each device has a unique SCSI address.
   - Do not set any device to SCSI ID 7. This is usually the controller SCSI ID.

If the SCSI banner still does not banner on POST, check the following:

CAUTION	Always wear an antistatic wrist guard when working inside the HP Server.

1. If the SCSI controller is an adapter board:
   a. Power off the HP Server. Unplug the power cord from the power source and remove the covers.

b. Reseat the SCSI controller board in its slot.

c. Replace the covers, plug the power cords back into a power source, and power on the HP Server.

2. If the SCSI controller still does not banner on POST:

a. Do all the previous to power off the HP Server then move the SCSI controller board into another slot.

b. If this still does not resolve the issue:

- Clear CMOS (See the previous instructions in this chapter on Clearing the BIOS Configuration.)
- Flash the system BIOS (See the previous instructions in this chapter on System BIOS Update.)

Contact the HP Customer Support Center for further troubleshooting assistance before replacing any parts.

A SCSI Device Stops Working

If a SCSI device stops working:

1. Verify it banners on POST or is seen in the SCSI Select Utility.
2. Run DiagTools and verify:

a. SCSI Ids and any relevant switch settings.

b. SCSI bus information.

3. If an accessory board was added recently, check for a resource conflict between the new board and an existing accessory boards.

a. Remove the board and restart the HP Server.

b. If this corrects the problem, the new board is either defective or it is trying to use a system resource used by another SCSI controller board.

c. Try the accessory board in another slot.

4. Check for any recent changes or upgrades to the software. For example, has anyone moved, removed, or changed the configuration files or drivers? Refer to the software documentation for more information.
5. If you suspect hardware failure and there are no system error messages, check each component associated with the failure. Equipment failure is probably the most unlikely reason for a SCSI device failure.

Contact the HP Customer Support Center for further troubleshooting assistance before replacing any parts.

A SCSI Device Does Not Work After Installation

NOTE	The SCSI controller board supplied with some HP Servers come with a single channel SCSI controller board and cannot support internal and external SCSI devices on the same controller.

NOTE	Refer to the documentation provided with the SCSI device for any specific information regarding installation.

If a SCSI device does not work after installation, do the following:

1. If using a single channel SCSI controller for external devices, make sure not internal devices are connected on the internal channel of the SCSI controller. HP does not support using both internal and external connections on a single-channel controller, and a second SCSI controller board must be purchased for use with the external SCSI device.

2. Verify the SCSI BIOS is being executed properly. The internal and external SCSI device controllers display a banner during startup. The BIOS then checks for valid devices on the SCSI bus, and reports which devices are found. If the SCSI devices are installed and configured correctly, a list confirming the devices will banner on POST after the controller banners.
3. Verify the switch settings on the SCSI device/s are correct.
4. Verify each SCSI device is assigned a unique SCSI ID.
5. Ensure no SCSI device is set to SCSI ID 7. This SCSI address is generally used by the SCSI controller.
6. Ensure all installed SCSI controllers are configured correctly.
7. If the SCSI devices installed in an external connected to the HP Server operate in Ultra SCSI or FAST SCSI mode, this may cause a problem. The SCSI controller board and the internal SCSI devices normally provided with the HP Servers operate in Ultra 160 SCSI mode. The external SCSI devices may be slowing down or causing the internal SCSI controller board to be ineffective and therefore non-operational.
8. Check the SCSI cables for problems that may be caused by any recent HP Server maintenance, hardware upgrades, or physical damage.
9. Check the system BIOS version to ensure it is the most recently issued version. The most recent version is listed on HP's website.
10. Verify the SCSI bus is terminated at both ends. By default, HP Server SCSI controllers in external enclosures are terminated. When a device is connected to a connector on the SCSI bus, bus termination for that connector is disabled. Verify the last device on the bus is terminated.

NOTE	Some tape drives do not banner on POST but will show up in the SCSI BIOS Utility for the controller and in the operating system.

Contact the HP Customer Support Center for further troubleshooting assistance before replacing any parts.

Processor Problems

Contact the HP Customer Support Center for further troubleshooting assistance before replacing any parts.

Memory Problems

NOTE	The HP Server tc4100 uses only 133 MHz (PC133) SDRAM DIMMS. The EDO DIMMS and PC 100 SDRAM DIMMS from earlier HP Server models will fit into the DIMM slots in the HP Server tc4100, but the EDO DIMMS and PC 100 SDRAM will not function properly and are not supported.

The memory modules used for the HP Server tc4100 are DIMMS.

1. Review the troubleshooting checklist from this manual before you continue.
2. If memory problems are being experienced, power the HP Server off and on gracefully. This performs a "cold" restart rather than a "warm" restart by doing a CTRL-ALT-DELETE.
3. Verify that all the DIMMS are HP DIMMS.
4. Verify that all the DIMMS are the correct HP DIMMS for this particular HP Server.
5. Verify that all the memory is counted during the Power On Self Test (POST).

6. Run the HP DiagTools memory test.

CAUTION	Always wear an antistatic wrist guard when working inside the HP Server.

If the problem persists:

1. Power off the HP Server, unplug the power cord from the power source and remove the left side cover.
2. Locate and reseat the memory modules.
3. Plug the power cord back into the power source and power on the HP Server.
4. Verify that all the memory is counted during the Power On Self Test (POST).

If the problem still persists:

1. Power off the server and unplug the power cord for the power source.
2. Remove all but one DIMM.
3. Plug the power cord back into the power source and power on the HP Server.
4. If the error is not present, power off and unplug the server then add another DIMM, continuing this process until all the DIMMS are installed or a failure occurs.
5. Verify the failure by reinstalling the DIMM by itself and attempt to duplicate the error.
6. Try the faulty DIMM in another memory slot to confirm that the slot is not defective.
7. Replace the defective DIMM.

Contact the HP Customer Support Center for further troubleshooting assistance if needed

Network Interface Card (Embedded or PCI) Problems

If the adapter cannot connect to the network

If the HP Server cannot connect to the network and all the LEDs are lit on the NIC:

1. Verify that there are no resource conflicts between the NIC and any other accessory. Do this from the system BIOS Setup Utility (<F2> on POST when prompted).
2. Reboot the HP Server and log into the NOS.
3. Ensure the latest and correct HP drivers are being used for the NIC.
4. Ensure the port on the switch or hub (or other device) has the same speed and duplex settings as on the NIC.

CAUTION	Setting an incorrect duplex mode can degrade performance, cause data loss, or result in lost connections.

5. Test the NIC as directed in the installation tasks for each NOS. This information is in the HP Server's Installation Manual. Also check the README files on the support driver's disk.
6. Use the PING command to verify TCP/IP configuration.
   a. Ping the IP address of the default gateway. If the PING command fails, verify that the default gateway IP address is correct and that the gateway (router) is operational.

b. Ping the IP address of a remote host (a host that is on a different subnet). If the PING command fails, verify that the remote host IP address is correct, that the remote host is operational, and that all of the gateways (routers) between this computer and the remote host are operational.

7. Directly connect two devices (with no hub, switch, or other device) using a "crossover" cable. PING the other computer's IP address.

NOTE	The PING command uses Internet Control Message Protocol (ICMP) Echo Request and Echo Reply messages. Packet filtering policies on routers, firewalls, or other types of security gateways might prevent the forwarding of this traffic.

LEDs are not lit on the NIC

No lit LEDs probably indicates a bad network cable, hub connection, or other network error.

1. Ensure that the cabling is installed correctly:
   a. Try another known good network cable.
   b. Try another network connection (another hub, switch, etc.)
   c. Connect the NIC to a known good network connection.

If there are still no lit LEDs, do the following:

2. Power off the HP Server and unplug the power cord/s from the power source. Remove the left side cover.

NOTE	The HP Server tc3100 has an integrated NIC so skip the following steps unless a PCI NIC is installed in the server.

CAUTION	Always wear an antistatic wrist guard when working inside the HP Server.

3. . Locate the NIC and reseat it in its slot.
4. Replace the covers; plug in the power cord/s to a power source, and power on the HP Server.
5. If the problem persists, perform previous step 2 and 3 but move the NIC to another slot.
6. Replace the covers; plug in the power cord/s to a power source, and power on the HP Server.

If the problem persists, contact the HP Customer Support Center for further troubleshooting assistance before replacing any parts.

7 Replacing Parts

Safety Information

Safety precautions should be followed when servicing the HP Server. Follow the procedures listed below to ensure safe handling of components and to prevent harm to both you and the HP Server:

- Use an antistatic wrist strap and a grounding mat, such as those included in the Electrically Conductive Field Service Grounding Kit (HP 9300-1155).
- Handle accessory boards and components only by the edges. Do not touch any metal-edge connectors or any electrical components on accessory boards.
- Do not wear clothing subject to static charge build-up, such as wool or synthetic materials.

WARNING	Hazardous voltages are present inside the HP Server. ALWAYS remove AC power from the System Processing Unit and other associated assemblies while working inside the unit. Serious injury may result if this warning is not observed.

Service Tools Required

Service of this HP Server may require one or more of the following tools:

- 1/4 inch Flat Blade Screwdriver
- ACX-15 Torx® Screwdriver

Replacing the Flexible Disk Drive

Removing the Flexible Disk Drive

1. Power down the HP Server.
2. Disconnect the power cord(s) and other cables from the back of the server.

WARNING	The power supplies continue to provide standby voltage to the HP Server until the power cord(s) is/are disconnected.

3. If applicable, remove the server from the rack.
4. Remove the right access panel (pedistal model) or the bottom access panel (rack-mount model) by pressing in on the release button with your thumb as you pull the latch out with your fingers.
5. When the latch is fully lifted, the access panel slides back towards the rear of the server. The panel can then be lifted off the server chassis.
6. Remove the front bezel by pushing in on the tabs at the top of the bezel on both sides and pulling the bezel out away from the chassis. Do the same to release the bottom part of the bezel.
7. Disconnect the signal cable (ribbon cable) and the power cord(s) from the rear of the flexible disk drive.

8. From the front of the server, press the two tabs on the sides of the flexible disk drive and slide the drive forward and out of the chassis..

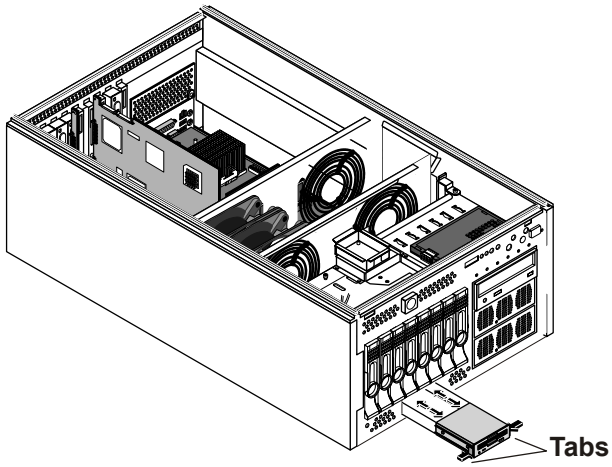


Figure 7-1. Flexible Disk Drive Removal

9. The blue plastic rails need to be removed from the original flexible disk drive and insert them on the new drive. Pull out the rail and it will detach from the drive. Line up the two prongs and insert in the holes on the new drive.

Installing the Flexible Disk Drive

1. Install the new flexible disk drive into the chassis. The blue tabs on the rails will click when they lock into place in the chassis.
2. Reconnect both cables to the rear of the drive.

NOTE	The flexible disk drive connectors are keyed. Ensure that the cables are fully seated.

3. Replace the front bezel.
4. Replace the access panel. When installing the access panel, line up the tabs on the cover with the slots in the chassis. As the latch is returned to the closed position, the panel will be pulled forward by the latch.

Replacing the CD-ROM Drive

Replace the CD-ROM Drive only after you verify the failure with Diagtools.

Removing the CD-ROM Drive

1. Power down the HP Server and disconnect the power cord(s) from the back of the server.

WARNING	The power supplies continue to provide standby voltage to the HP Server until the power cord(s) is/are disconnected.

2. Disconnect any other cables from the back of the server.
3. If applicable, remove the server from the rack.
4. Remove the left access panel (pedistal model) or the top access panel (rack-mount model) by pressing in on the release button with your thumb as you pull the latch out with your fingers.

5. When the latch is fully lifted, the access panel slides back towards the rear of the server. The panel can then be lifted off the server chassis.
6. Remove the front bezel by pushing in on the tabs at the top of the bezel on both sides and pulling the bezel out away from the chassis. Do the same to release the bottom part of the bezel.
7. Remove blue plastic Air Scoop that is attached to the fan cage and the System Board by pulling it straight out.
8. Remove the fan assembly from the fan cage; locate the thumbscrew and loosen it. Pull out on the fan assembly to remove it from the fan cage.
9. Disconnect the IDE cable and the power cable from the back of the CD-ROM drive
10. .From the front of the server, locate the CD-ROM drive and push in on the blue tabs on the sides of the CD-ROM drive and slide the CD-ROM drive forward out of the chassis.

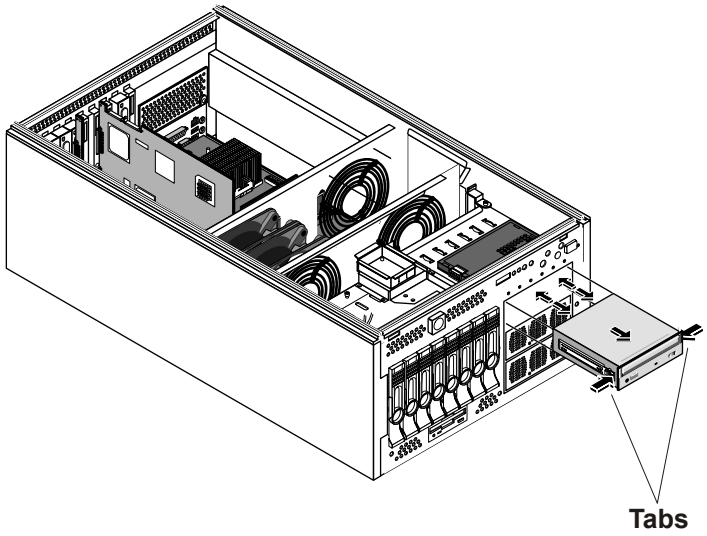


Figure 7-2. Removing the CD-ROM Drive

11. The blue plastic rails need to be removed from the original CD-ROM drive and insert them on the new drive. Pull out the rail and it will detach from the drive. Line up the two prongs and insert in the holes on the new drive.

Installing the CD-ROM Drive

1. Install the new CD-ROM drive into the chassis. The blue tabs on the rails will click when they lock into place in the chassis.
2. Reverse the previous steps to connect the cables and install the fan assembly

NOTE	When installing the fan assembly, make sure the SCSI cable is not over the connector where the fan assembly plugs in..

NOTE	The CD-ROM drive connectors are keyed. Ensure that the cables are fully seated.

3. Install the Air Scoop by aligning the two holes on the top and bottom of the scoop with the posts on the System Board. Attach the Air Scoop, making sure that the plastic tab also inserts into the fan cage.
4. Replace the front bezel.

5. Replace the access panel. When installing the access panel, line up the tabs on the cover with the slots in the chassis. As the latch is returned to the closed position, the panel will be pulled forward by the latch.

Replacing the Hot Swap Drive Cage Backplane

Removing the Hot Swap Drive Cage Backplane

1. Power down the HP Server and disconnect the power cord(s) from the back of the server.

WARNING	The power supplies continue to provide standby voltage to the HP Server until the power cord(s) is/are disconnected.

CAUTION	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin.

2. Disconnect any other cables from the back of the server.
3. If applicable, remove the server from the rack.
4. Remove all hot swap hard drives from the chassis.
5. Remove the left access panel (pedistal model) or the top access panel (rack-mount model) by pressing in on the release button with your thumb as you pull the latch out with your fingers.
6. When the latch is fully lifted, the access panel slides back towards the rear of the server. The panel can then be lifted off the server chassis.
7. Remove the front bezel by pushing in on the tabs at the top of the bezel on both sides and pulling the bezel out away from the chassis. Do the same to release the bottom part of the bezel.
8. Remove blue plastic Air Scoop that is attached to the fan cage and the System Board by pulling it straight out.
9. Remove the fan assembly from the fan cage; locate the thumbscrew and loosen it. Pull out on the fan assembly to remove it from the fan cage.
10. With the fan cage removed, the backplane SCSI connections will be accessible. Remove the SCSI A cable, the SCSI B cable (if applicable), and the power connectors from the hot-swap drive cage backplane.
11. Remove the backplane mount plate by first unscrewing the single blue thumbscrew on the side of the mount plate.

12. Release the mount plate from the chassis by first raising it up slightly out of the lower slot, and then swinging it out towards the rear of the server and lifting it out of the chassis. See *Figure 7-3*..

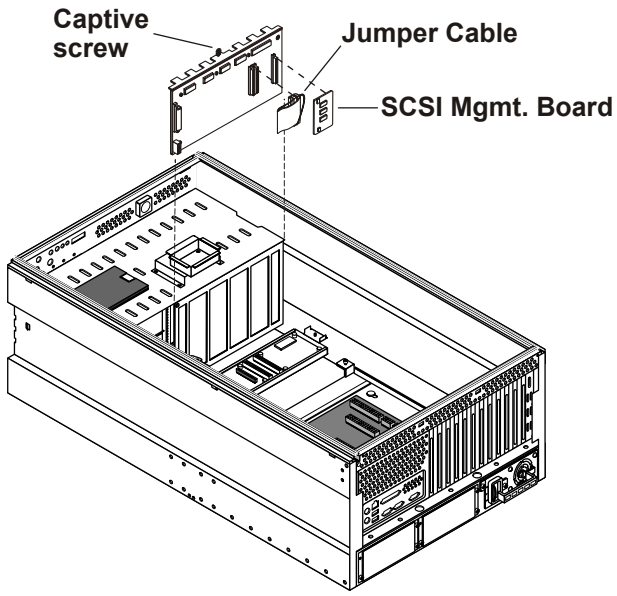


Figure 7-3. Hot Swap Drive Cage Backplane Removal

13. Place the mount plate on a work surface and disconnect the SCSI jumper cable, if installed, and either one or two hot-swap drive cage management boards (terminators), which ever is applicable.
14. Locate and remove the eight Torx 15 screws, four per side, that are attaching the backplane to the mount plate.

Installing the Hot Swap Drive Cage Backplane.

1. Install the new backplane to the mount plate by securing it with the eight Torx 15 screws.
2. To reinstall it in the chassis, align the mount plate into the metal rail and slide the mount plate into position, making sure that all cables are out of the way. Secure the mount plate to the chassis with the blue thumbscrew.
3. Reverse the steps listed above to reassemble the server.

NOTE	When installing the fan cage, be very careful to move all cables out of the way so they don't get pinched when sliding the fan cage in on the rails. When installing the fan assembly, make sure the SCSI cable is not over the connector where the fan assembly plugs in.

Replacing the Fan Assembly

Replace the Fan Assembly when the system indicates slow or failing fans. The fans are contained in a single replaceable module enclosed in the fan tray. The fan tray and the attached air scoop are removed to upgrade system board parts, remove the system board, or access power and signal cables.

Removing the Fan Assembly

1. Power down the HP Server and disconnect the power cord(s) from the back of the server.

WARNING	The power supplies continue to provide standby voltage to the HP Server until the power cord(s) is/are disconnected.

2. Disconnect any other cables from the back of the server.
3. If applicable, remove the server from the rack.
4. Remove the left access panel (pedistal model) or the top access panel (rack-mount model) by pressing in on the release button with your thumb as you pull the latch out with your fingers.
5. When the latch is fully lifted, the access panel slides back towards the rear of the server. The panel can then be lifted off the server chassis.
6. Remove blue plastic Air Scoop that is attached to the fan cage and the System Board by pulling it straight out.
7. Remove the fan assembly from the fan cage; locate the thumbscrew and loosen it. Pull out on the fan assembly to remove it from the fan cage.

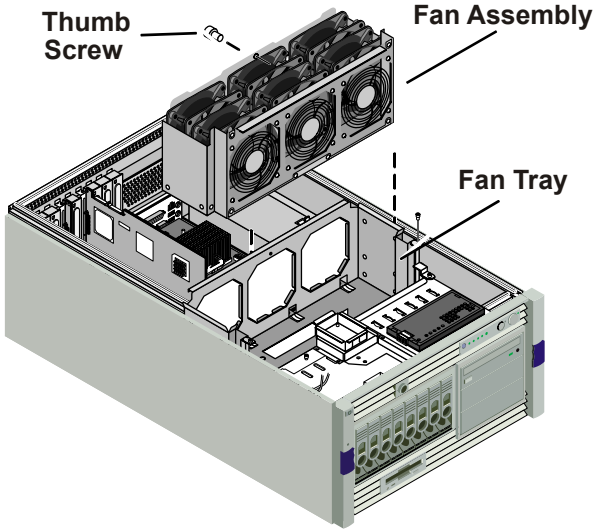


Figure 7-4. Fan Assembly Removal

Removing the Fan Tray

NOTE	It may be necessary to remove some of the accessory boards (full length accessory boards) before removing the fan tray. Generally, you only need to remove the fan tray to remove the system board or access the cables.

1. Remove the air duct by un-snapping the latch on the top of the air duct and lifting the air duct up.
2. Remove the air baffle by un-snapping a latch at the rear end and pulling up straight

3. Remove the fan tray by loosening the two thumbscrews holding it in place.

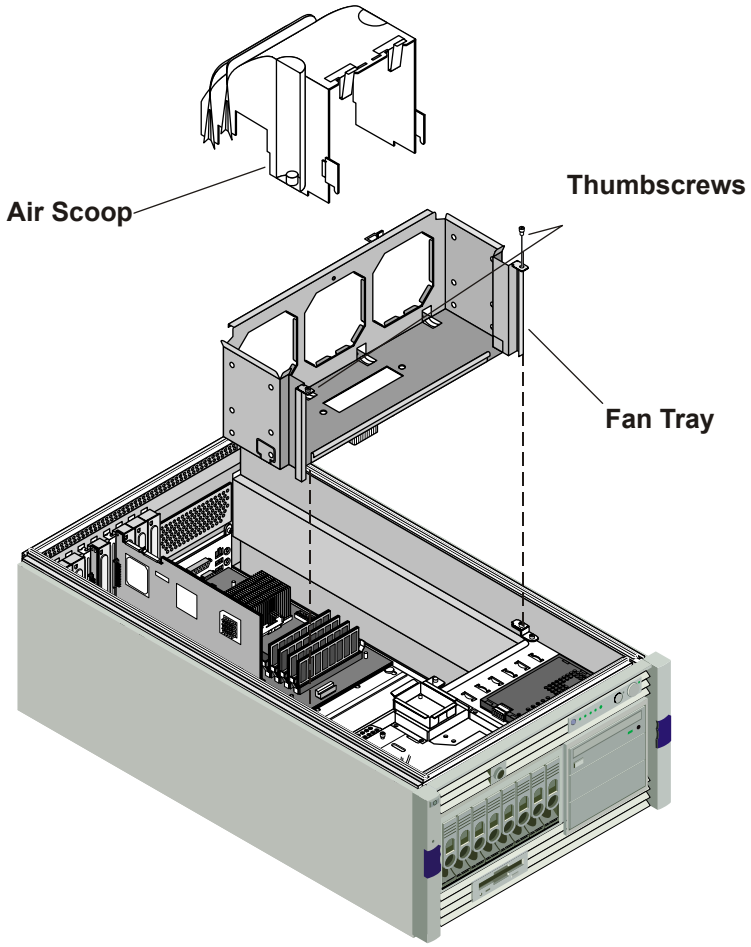


Figure 7-5. Removing the Fan Tray

4. Lift the fan tray up and out of the chassis.

Installing the Fan Tray

Install the new fan tray and air scoop, then reverse the steps listed above to reassemble the server.

Installing the Fan Assembly

Install the new fan assembly then reverse the steps listed above to reassemble the server.

NOTE	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure that the metal of the wrist strap contacts your skin.

Replacing the Power Supply

Replace a failed power supply or install a redundant power supply in the HP Server. Only one power supply (425 Watt) is required for the HP Server. If power supply backup or redundancy is required, then an additional power supply may be installed in slot #2.

If there is only one power supply installed, then the system will go down or fail to boot when the power supply fails. The status LED on the defective supply will be off (dark).

If two power supplies are installed and one supply fails, the other supply will continue to operate and a front panel LED should turn red to indicate there is a problem. The status LED on the defective power supply will be off (dark). When power is applied to the system verify that the status LEDs for both supplies glows green.

WARNING	If a power supply bay is not in use, be sure to keep the cover on it. If you do not, system ventilation and EMI (electro-magnetic interference) suppression may be affected. Always insert a power supply filler panel into an empty power supply bay. Operating with an empty bay could cause thermal damage to the server.

CAUTION	Gently insert power supply into the bay to avoid causing damage to the connector (DO NOT SLAM).

Removing the Power Supply

1. Locate the desired power supply for removal. Refer to *Figure 7-6* for location of power supply status LEDs.

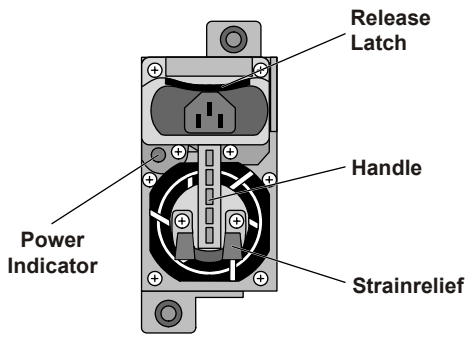


Figure 7-6. Power Supply Rear Panel

NOTE	If the HP Server is powered on (Power LED on front is green) and the status LED for one of the seated power supplies is off, the supply has failed. However, when the HP Server is in standby (plugged in but not powered-down), the power supply status LEDs will be off (dark).

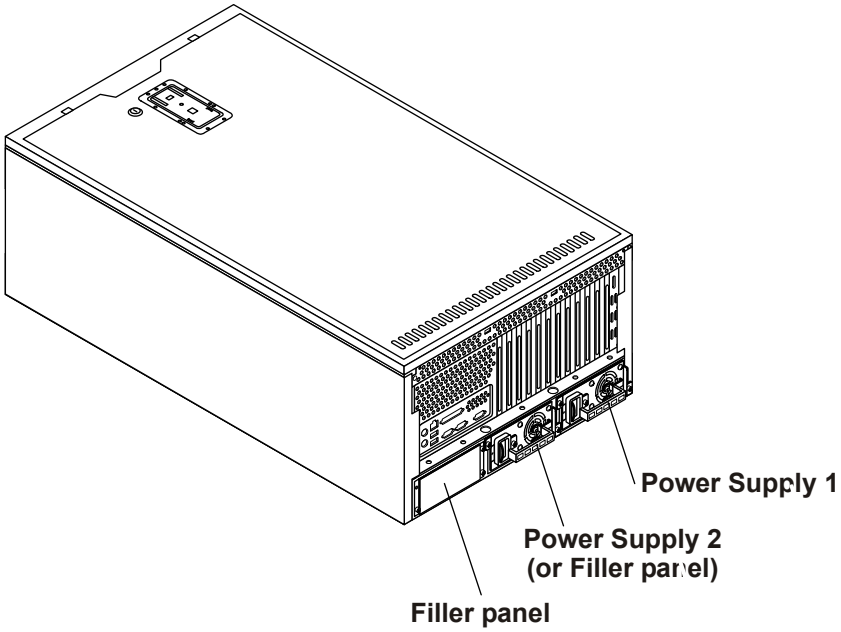


Figure 7-7. Power Supply Location

2. Remove the AC power cord from the inlet on the supply.
3. Loosen the two captive screws.
4. Grasp the handle and use your thumb to depress the release latch.
5. Pull the power supply out of the chassis.

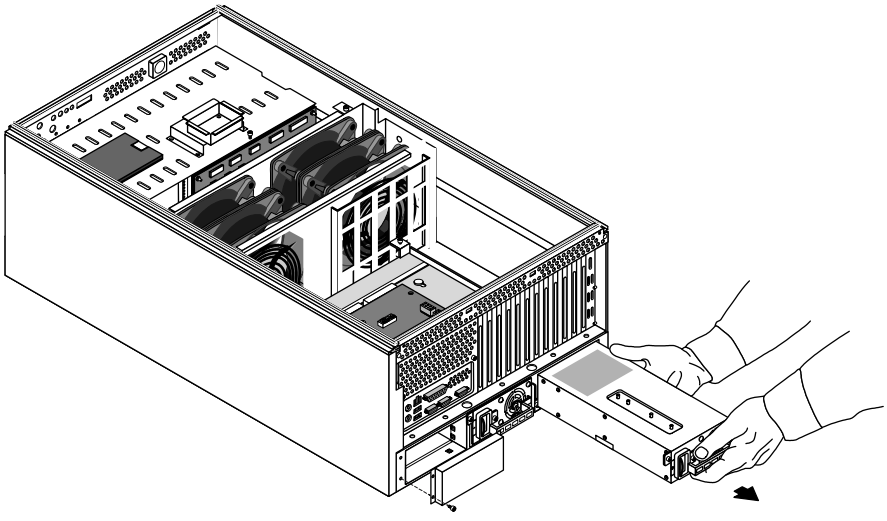


Figure 7-8. Removing Power Supply

Installing the Power Supply

1. Slowly slide the replacement or redundant power supply into the chassis until the latch locks the power supply into place.
2. Secure the two captive screws.
3. Insert the power cord into the power inlet.
4. Verify that the status LED goes On (green) when the HP Server is powered up.

Replacing the System Battery

The HP Server uses a Lithium battery to support the real time (Time and Date) clock and configuration data in NVRAM. If your HP Server repeatedly loses its configuration, or the time of day clock stops, replace the battery.

System battery failure is normally signaled by POST error code 011.

Removing the System Battery

WARNING	There is a danger of explosion if the battery is incorrectly installed. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries safely in accordance with local ordinances.

1. Power down the HP Server. Refer to *"Powering Down the HP Server tc4100" on page 14*.
2. Disconnect the power cord(s).

WARNING	The power supplies continue to provide standby voltage to the HP Server until the power cord(s) is/are disconnected.

3. If rack-mounted, extend the HP Server out of the rack.
4. Remove the left cover (pedestal) or top cover (rack-mounted). Refer to *"Opening and Closing the HP Server tc4100" on page 21*.

CAUTION	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure that the metal of the wrist strap contacts your skin.

5. Remove the air scoop. Refer to *"Removing the Fan Assembly" on page 106*.

6. Locate the system battery on the system board.

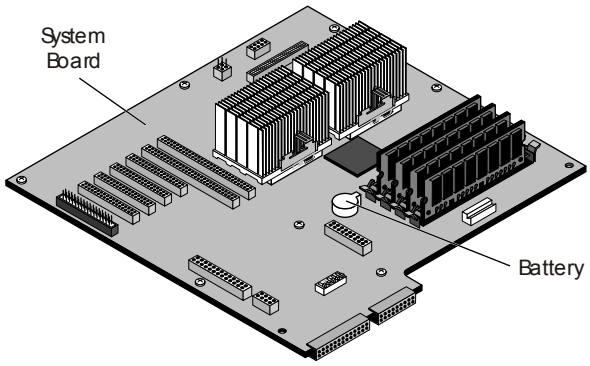


Figure 7-9. Battery Location

7. Use a small flat-blade screwdriver and pop the battery out of the plastic socket by sliding the blade under the leaf spring on the top of the battery.

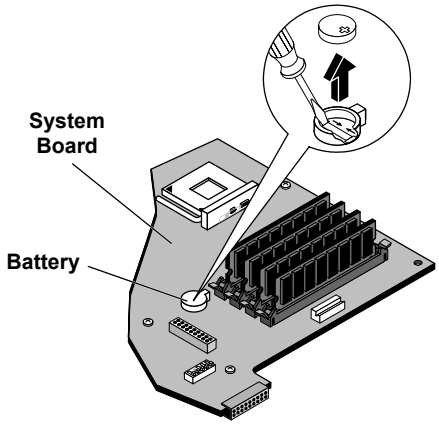


Figure 7-10. Removing Battery

Installing the System Battery

1. Insert the new battery with the positive sign (+) facing up, and ensure that it is seated completely.
2. Verify that the retaining clip is in place, and holds the battery firmly.
3. To complete battery replacement, reverse steps 1-7.
4. If necessary, reset the date and time on the HP Server.

Replacing the System Board Assembly

Removing the System Board

1. Power down the HP Server and disconnect the power cord(s) from the back of the server.

WARNING	The power supplies continue to provide standby voltage to the HP Server until the power cord(s) is/are disconnected.

CAUTION	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin.

2. Disconnect any other cables from the back of the server.
3. Remove the left access panel (pedistal model) or the top access panel (rack-mount model) by pressing in on the release button with your thumb as you pull the latch out with your fingers.
4. When the latch is fully lifted, the access panel slides back towards the rear of the server. The panel can then be lifted off the server chassis.
5. Remove the front bezel by pushing in on the tabs at the top of the bezel on both sides and pulling the bezel out away from the chassis. Do the same to release the bottom part of the bezel.
6. Remove blue plastic Air Scoop that is attached to the fan cage and the System Board by pulling it straight out.
7. Remove the fan assembly from the fan cage; locate the thumbscrew and loosen it. Pull out on the fan assembly to remove it from the fan cage.
8. Remove the fan cage by unscrewing the two thumbscrews then pulling it out of the chassis.
9. Disconnect all the cables from the System Board. The cable configuration may vary depending on what is installed in the system. See .*Figure 7-11*

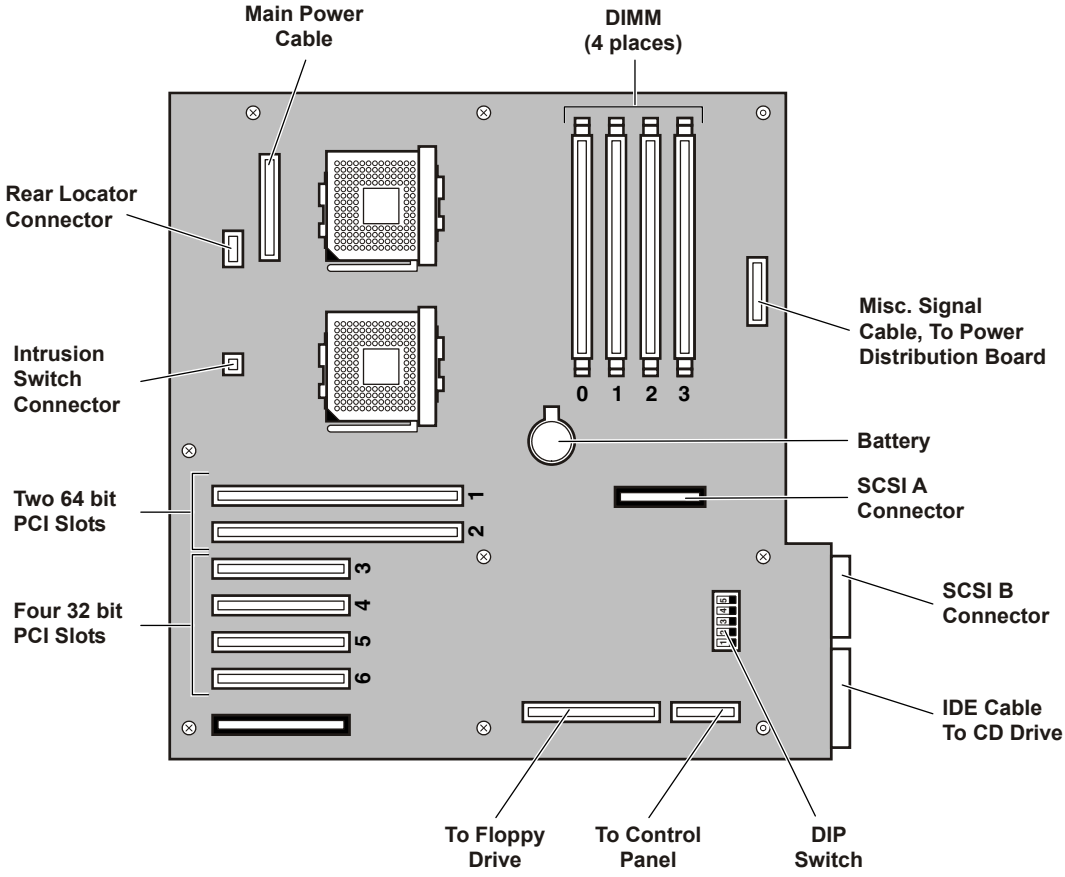


Figure 7-11. System Board Connectors

10. Remove the power cable from the plastic holder on top of the chassis.
11. Remove the Control Panel cable and the IDE cable from the System Board chassis by pulling back on the plastic tab, then pulling out on the center piece to open the latch.
12. Remove the processor(s) and DIMMs. See the instructions in previous chapters on how to remove the processors and DIMMs. Place them in appropriate anti-static bags or on an anti-static pad.

13. The System Board assembly is secured to the chassis by four blue thumbscrews. Two of these screws are on the System Board assembly and closest to the front of the server. The other two thumbscrews are at the rear of teh server inside the chassis.
14. Loosen the four captive thumbscrews. See .*Figure 7-12*

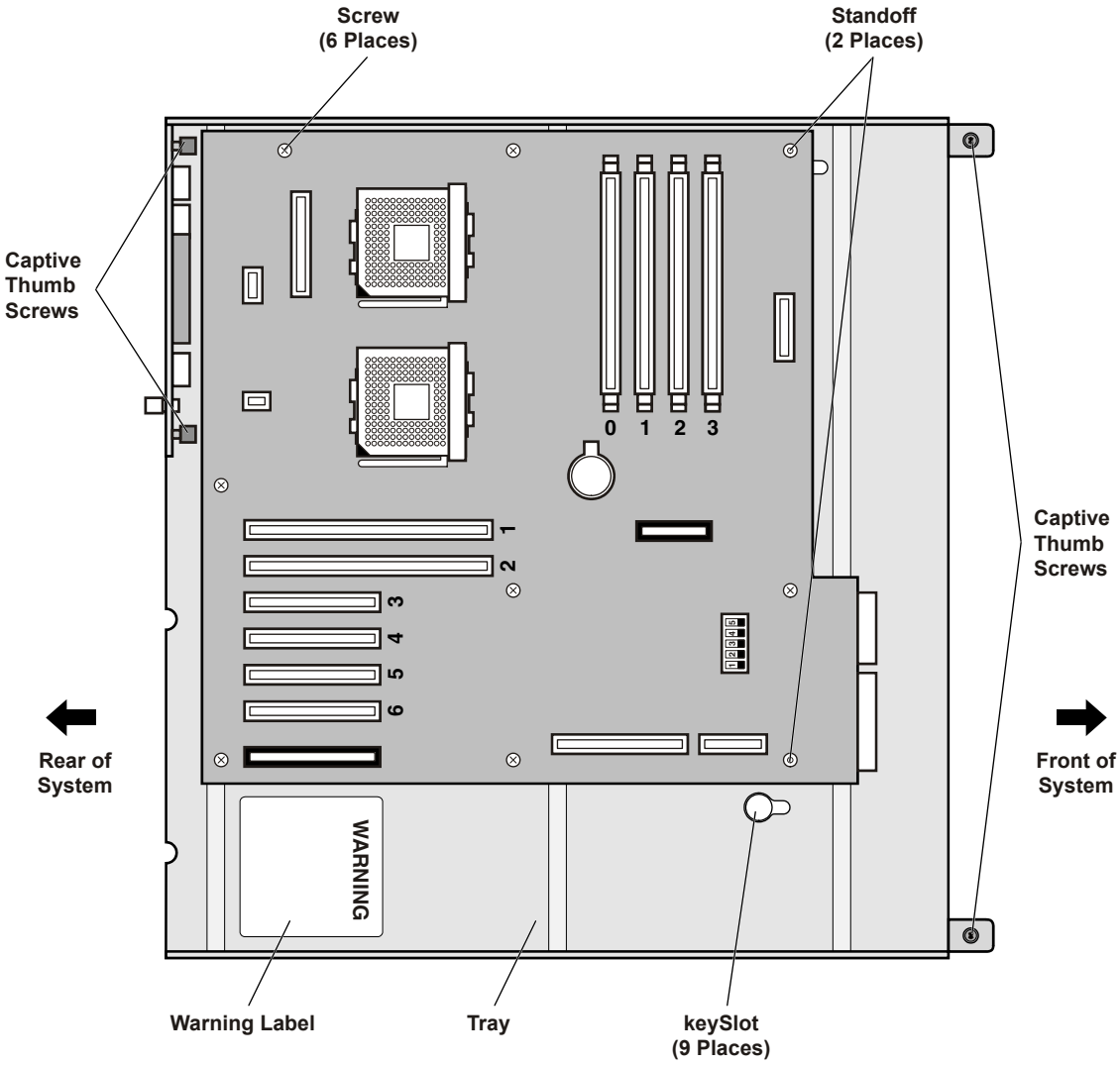


Figure 7-12. Captive Screw Locations

15. Slide the system board towards the front of the system until it stops (approximately 1/2 inch).
16. Using the thumbscrews closest to the top of the server (pedistal model) or right side of the server (rack-mount model), pull up and out to remove the System Board assembly out of the chassis.

Installing the System Board Assembly

1. Install the new System Board on the System Board assembly.

2. Reverse the above steps to reassemble the server. See the instructions in previous chapters on how to properly install the processor(s) and heat sink(s).

NOTE	When installing the fan cage, be very careful to move all cables out of the way so they don't get pinched when sliding the fan cage in on the rails. When installing the fan assembly, make sure the SCSI cable is not over the connector where the fan assembly plugs in.

3. Replace the access panel. When installing the access panel, line up the tabs on the cover with the slots in the chassis. As the latch is returned to the closed position, the panel will be pulled forward by the latch.

Replacing the Power Distribution Board

Removing the Power Distribution Board

1. Power down the HP Server and disconnect the power cord(s) from the back of the server.

WARNING	The power supplies continue to provide standby voltage to the HP Server until the power cord(s) is/are disconnected.

CAUTION	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin.

2. Disconnect any other cables from the back of the server.
3. If applicable, remove the server from the rack.
4. Remove the left access panel (pedistal model) or the top access panel (rack-mount model) by pressing in on the release button with your thumb as you pull the latch out with your fingers.
5. When the latch is fully lifted, the access panel slides back towards the rear of the server. The panel can then be lifted off the server chassis.
6. Remove blue plastic Air Scoop that is attached to the fan cage and the System Board by pulling it straight out.
7. Remove the fan assembly from the fan cage; locate the thumbscrew and loosen it. Pull out on the fan assembly to remove it from the fan cage.
8. Remove the fan cage by unscrewing the two thumbscrews then pulling it out of the chassis.
9. With the fan cage removed, the backplane SCSI connections will be accessible. Remove the SCSI A cable, the SCSI B cable (if applicable), and the power connectors from the hot-swap drive cage backplane.
10. Disconnect all seven cables that are attached to the Power Distribution Board.

11. From the right side of the server (pedistal model) or the bottom side of the server (rack-mount model), locate the two blue captive thumbscrews and loosen them to remove the Power Distribution Board metal plate from the chassis. See *Figure 7-13*

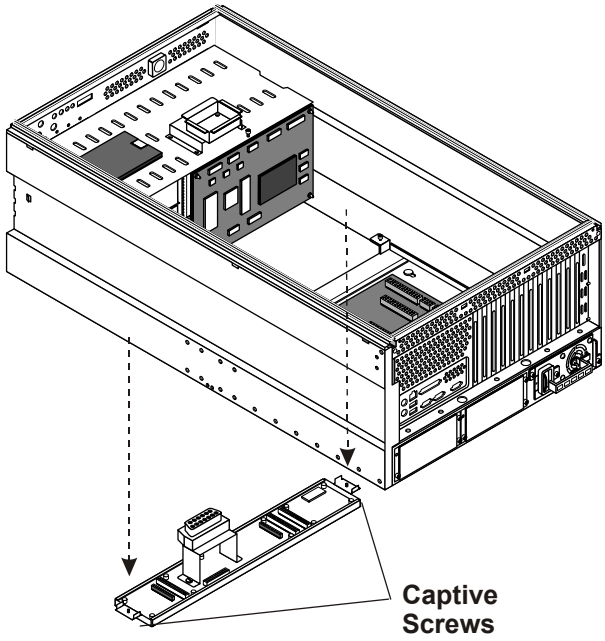


Figure 7-13. Power Distribution Board

12. First, remove the two Torx 15 screws that hold the fan connector to the Power Distribution Board. Then, pull up on the connector and disconnect the fan connector from the Power Distribution Board.
13. Remove the two remaining Torx 15 screws.
14. Disengage the Power Distribution Board from the metal plate by moving it towards one side to disengage the board from the pins on the metal plate.

Installing the Power Distribution Board.

1. Install the new Power Distribution Board.
2. Reverse all the previous steps to reassemble the server.

NOTE	When installing the fan cage, be very careful to move all cables out of the way so they don't get pinched when sliding the fan cage in on the rails. When installing the fan assembly, make sure the SCSI cable is not over the connector where the fan assembly plugs in.

3. Replace the access panel. When installing the access panel, line up the tabs on the cover with the slots in the chassis. As the latch is returned to the closed position, the panel will be pulled forward by the latch.

Replacing the Diagnostic Board

You will only remove the diagnostic board from the HP Server when it is defective and requires replacement. The diagnostic board is enclosed in a protective cover. Remove the cover and save it for the replacement diagnostic board.

Removing the Diagnostic Board

1. Power down the HP Server. Refer to *"Powering Down the HP Server tc4100" on page 14*.
2. Disconnect the power cord(s).

WARNING	The power supplies continue to provide standby voltage to the HP Server until the power cord(s) is/are disconnected.

3. If rack-mounted, extend the HP Server out of the rack.
4. Remove left cover (pedestal) or top cover (rack-mounted) from the HP Server. Refer to *"Opening and Closing the HP Server tc4100" on page 21*.

NOTE	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure that the metal of the wrist strap contacts your skin.

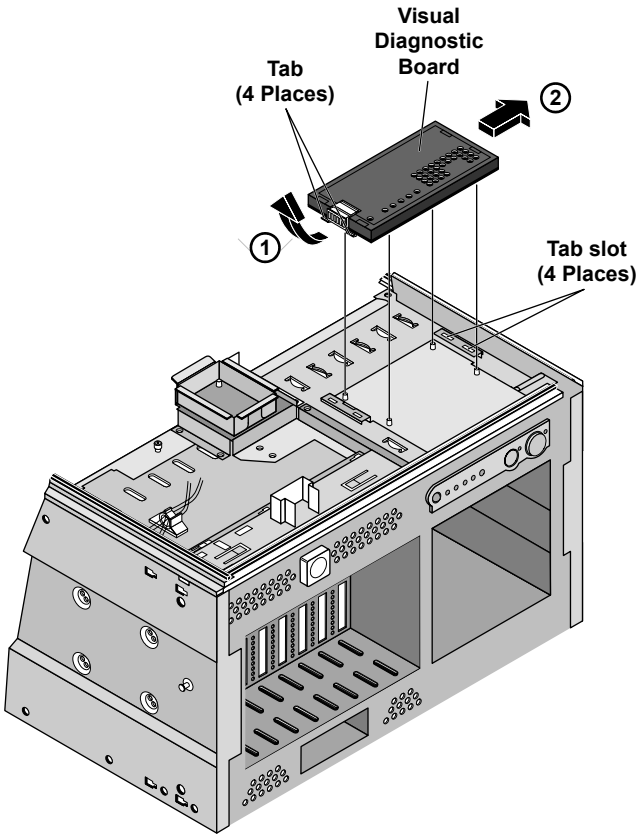


Figure 7-14. Diagnostic Board Removal

5. Remove the signal connectors from the diagnostic board.
6. Push the diagnostic board cover to the right; lift the board from the chassis.
7. Separate the diagnostic board from the cover. The cover will be used with the replacement diagnostic board.

Installing the Diagnostic Board

1. Install the replacement diagnostic board in the cover saved earlier.

2. Install the diagnostic board by reversing the procedure, *"Removing the Diagnostic Board" on page 116*.

Replacing the Control Panel

You will only remove the control panel from the HP Server when it is defective and requires replacement.

Removing the Control Panel

1. Power down the HP Server. Refer to *"Powering Down the HP Server tc4100" on page 14*.
2. Disconnect the power cord(s).

WARNING	The power supplies continue to provide standby voltage to the HP Server until the power cord(s) is/are disconnected.

3. If rack-mounted, extend the HP Server out of the rack.
4. Remove left cover (pedestal) or top cover (rack-mounted) from the HP Server. Refer to *"Opening and Closing the HP Server tc4100" on page 21*.

NOTE	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure that the metal of the wrist strap contacts your skin.

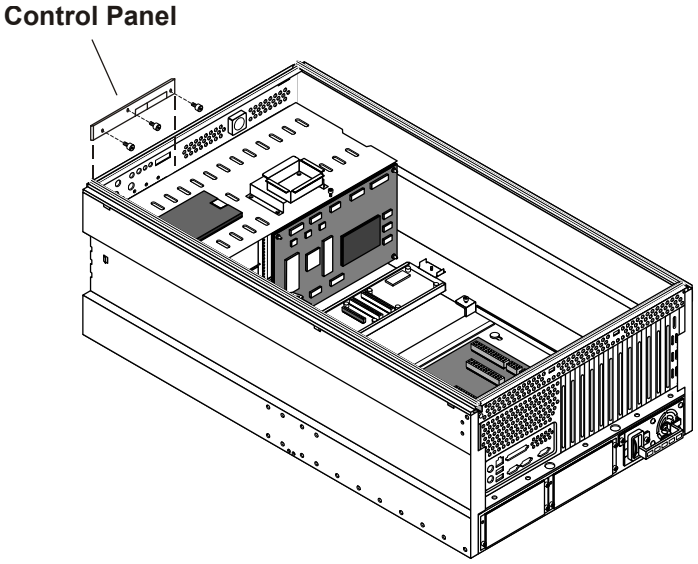


Figure 7-15. Control Panel

5. Remove three screws securing the control panel to the chassis.
6. Remove the signal connectors from the Control Panel.

Installing the Control Panel

Install the replacement control panel by reversing the procedure, *"Removing the Control Panel" on page 117*.

8 Parts Information

The Figures at the beginning of this chapter provide a view of the HP Server tc4100 replaceable parts. The complete list and description of these parts is in *Table 8-1, on page 120.*

Covers, Fans, Chassis Parts, and Mass Storage

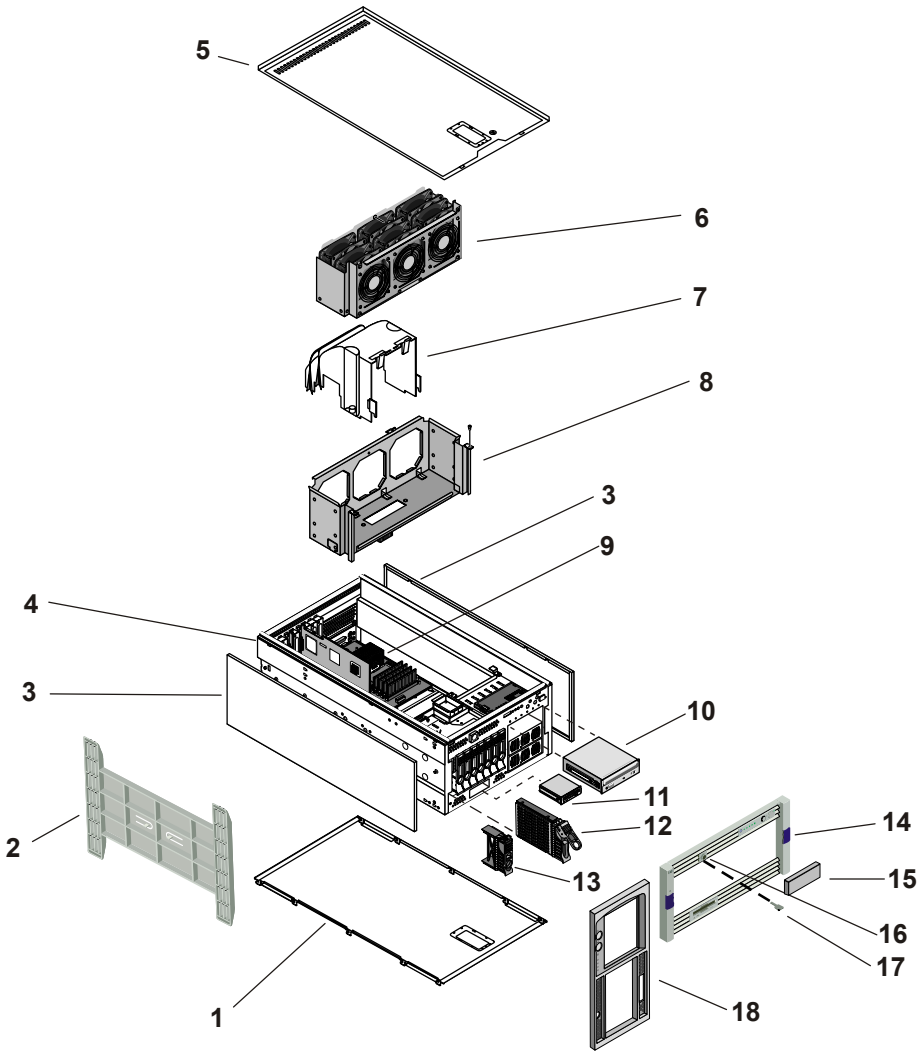


Figure 8-1. Covers, Fans, Chassis Parts, and Mass Storage

Power Supplies and Chassis Parts

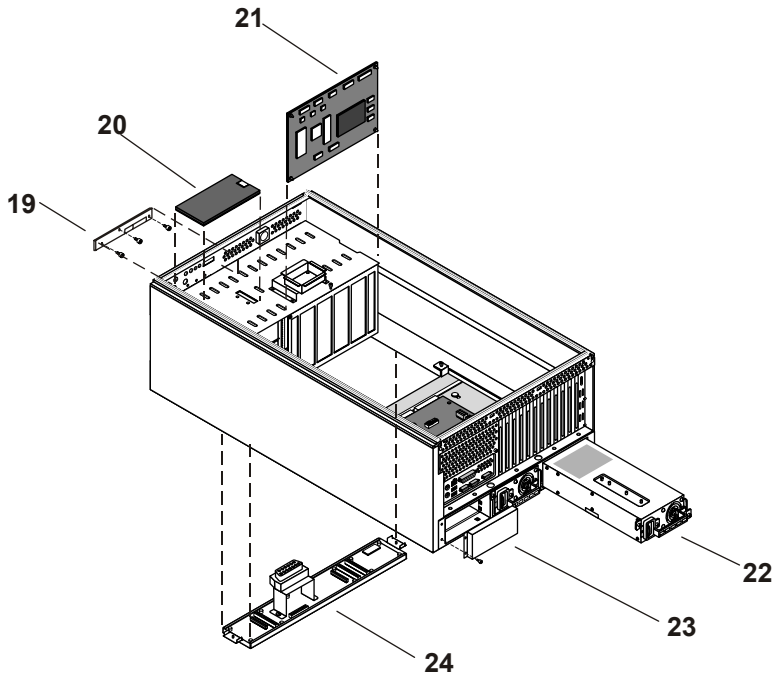


Figure 8-2. Power Supplies and Chassis Parts

System Board Parts

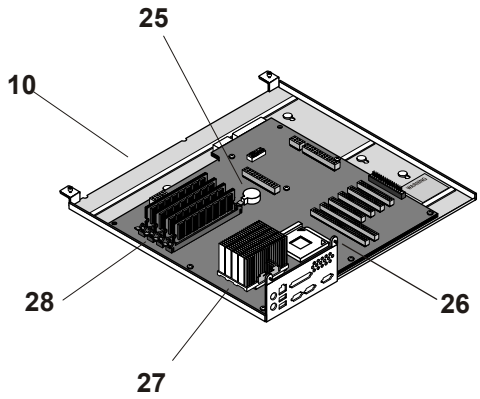


Figure 8-3. System Board Parts

Replaceable Parts List

NOTE The part numbers listed below were available at the time of publication. Part numbers may change after publication. Order parts by the number listed below; HP's parts price list database will generally contain a reference to the revised part number. If a processor baseboard or I/O baseboard needs to be replaced, remove processor modules, or adapter boards and transfer these to the new board. Make note of all jumpers and switch settings on the old board and transfer these to the new board.

Table 8-1. Part Numbers

Item	Description	Replacement	Exchange
1	Right Cover	P2521-63032	
2	Pedestal Base	D8520-63017	
3	Top Cover	P2521-63034	
4	Chassis	Not Replaceable	
5	Left Cover w/Technical Reference Label	P3537-63019	
6	System Fan Assembly	P3537-67005	
7	Air Scoop	P3537-67004	
8	Fan Tray	Not Replaceable	
9	System Board Assembly	P3537-63011	P3537-69011
10	CD-ROM Half-Height IDE	D4384-63003	
*	HH CD-ROM Rail/Wire Assembly	P2521-63041	
11	FDD	5065-7466	
*	FDD Rail/Wire Assembly Left	P2521-67005	
*	FDD Rail/Wire Assembly Right	P2521-67006	
12	Hot-Swap Hard Drive		
13	Hot-Swap HDD Filler Panel	A6198-67001	
14	Rack Bezel Assembly	P2521-63036	
15	Non-Hot-Swap HDD Filler Panel	P3505-63026	
16	HDD Cage Lock Assembly	P2521-63048	
17	Key	5182-4534	
18	Pedestal Bezel Assembly	P2521-63035	
19	Front Control Panel	P3537-67009	
20	Diagnostic Board (Optional)	P3537-63000	
21	Hot-Swap HDD Cage Backplane	P2521-63013	P2521-69013
*	Hot-Swap HDD Cage Management Board	P2609-63001	
22	Power Supply	P2521-63017	P2521-69017
23	Power Supply Filler Panel	P2521-63037	
24	Power Distribution Board Assembly	P3537-63012	P3537-69012
25	System Board Battery	D8520-63012	
26	CPU Terminator	P1810-63029	

Table 8-1. Part Numbers

Item	Description	Replacement	Exchange
27	Processor 1.13 GHz/512K		
	Processor 1.26 GHz/512K		
	Processor 1.4 GHz/512K		
	Processor 1.53 GHz/512K		
	Processor 1.66 GHz/512K		
28	128MB 133MHz SDRAM DIMM	D8265-63001	D8265-69001
	256MB 133MHz SDRAM DIMM	D8266-63001	D8266-69001
	512MB 133MHz SDRAM DIMM	D8267-63001	D8267-69001
	1 GB 133MHz SDRAM DIMM	D8268-63001	D8268-69001
*	Pedestal Nameplate	P3537-67003	
*	Rack Nameplate	P3537-67002	
*	Rack Attach Left	P2521-63045	
*	Rack Attach Right	P2521-63046	
*	SCSI Jumper Cable	P2521-63030	
*	Locator Switch/Cable Assembly	P3537-63014	
*	Hot-Swap HDD Cage SCSI Cable	P3537-63005	
*	Non Hot Swap HDD SCSI Cable	P2521-63019	
*	Duplex SCSI Cable (Optional)	P2521-63020	
*	UDMA/IDE CD-ROM Cable	P3537-63003	
*	FDD Cable	P3537-63004	
*	Control Panel Cable	P2553-63031	
*	Diagnostic Board Cable	P2521-63024	
*	Fan Extension Cable	P2521-63025	
*	Power Supply to Power Dist. Cable	P2521-63026	
*	Misc. Signal Cable	P3537-63009	
*	System Board Power Cable	P3537-63008	
*	Drive Power Cable	P2521-63051	
*	Remote Management Cable	P3537-63010	
*	Intrusion Switch Assembly	P3537-63020	
*	Internal/External SCSI Cable	P3537-63015	

* This part is not in an exploded view.

9 Specifications

System Details

Weight and Dimensions

The following table displays the weight and dimensions of the HP Server tc4100 in the rack model.

Table 9-1. Weight and Dimensions (Rack Version)

Height	216 mm (8.5 in)
Width	480 mm (18.9 in)
Depth	721 mm (28.4 in)
Weight	36 kg (80 lb) This weight excludes monitor and keyboard

The following table displays the weight and dimensions of the HP Server tc4100 in the pedestal model.

Table 9-2. Weight and Dimensions (Pedestal Version)

Height	472 mm (18.6 in)
Width	345 mm (13.6 in)
Depth	721 mm (28.4 in)
Weight	36 kg (80 lb) This weight excludes monitor and keyboard

Video Display Modes

The HP Server tc4100 uses an ATI Rage XL video chip and 8MB video memory. *Table 9-3* lists the video specifications sorted by color depth, and *Table 9-4* lists the video specifications sorted by resolution.

Table 9-3. Video Specifications Sorted by Color Depth

Resolution	Color Depth	Refresh Frequency (HZ)
640 X 480	256	60,72,75,85,90,100,120
800 X 600	256	60,70,72,75,85,90,100
1024 X 768	256	60,70,72,75,85,90,100
1280 X 1024	256	60,70,74,75,85,90
1400 X 1050	256	60
1600 X 1200	256	58,60,66,70,75
640 X 480	64K	60,72,75,85,90,100,120
800 X 600	64K	60,70,72,75,85,90,100
1024 X 768	64K	60,70,72,75,85,90,100
1280 X 1024	64K	70,74,75,85,90
1600 X 1200	64K	58,60,66,70,75

Table 9-3. Video Specifications Sorted by Color Depth

Resolution	Color Depth	Refresh Frequency (HZ)
640 X 480	16.7M	60,72,75,85,90,100,120
800 X 600	16.7M	60,70,72,75,85,90,100
1024 X 768	16.7M	60,70,72,75,85,90,100
1280 X 1024	16.7M	60,70,74,75,85,90
640 X 480	True Color (32 bit)	60,72,75,85,90,100,120
800 X 600	True Color (32 bit)	60,70,72,75,85,90,100
1024 X 768	True Color (32 bit)	60,70,72,75,85,90,100
1280 X 1024	True Color (32 bit)	60,70,72,75,85,90,100

Table 9-4. Video Specifications Sorted by Resolution

Resolution	Color Depth	Refresh Frequency (HZ)
640 X 480	256	60,72,75,85,90,100,120
640 X 480	64K	60,72,75,85,90,100,120
640 X 480	16.7M	60,72,75,85,90,100,120
640 X 480	True Color (32 bit)	60,72,75,85,90,100,120
800 X 600	256	60,70,72,75,85,90,100
800 X 600	64K	60,70,72,75,85,90,100
800 X 600	16.7M	60,70,72,75,85,90,100
800 X 600	True Color (32 bit)	60,70,72,75,85,90,100
1024 X 768	256	60,70,72,75,85,90,100
1024 X 768	64K	60,70,72,75,85,90,100
1024 X 768	16.7M	60,70,72,75,85,90,100
1024 X 768	True Color (32 bit)	60,70,72,75,85,90,100
1280 X 1024	256	60,70,74,75,85,90
1280 X 1024	64K	70,74,75,85,90
1280 X 1024	16.7M	60,70,74,75,85,90
1280 X 1024	True Color (32 bit)	60,70,72,75,85,90,100
1600 X 1200	256	58,60,66,70,75
1600 X 1200	64K	58,60,66,70,75

Environment

The specifications listed below can vary if you install a mass storage device in your HP Server tc4100 that has more stringent environmental limits. Ensure that the operating environment is suitable for all mass storage devices in use.

Table 9-5. Environmental Requirements

BTU	1845 BTU/hr maximum
Temperature	Operating 5° C to 35°C (41°F to 95° F)
	Non-operating –40° C to +65° C (–40° F to +149° F)
Humidity	Operating 20% to 80% relative humidity (non-condensing)
	Non-operating 5% to 95% relative humidity (non-condensing)
Altitude	Operating -30 to 3,045 m (10,000 ft)
	Non-operating -30 to 12,180 m (40,000 ft)
Acoustic Emissions	Sound Level: (LpA) < 43 dB(A) bystander position

Power Specification

Input Power Requirements

Table 9-6 displays the HP Server tc4100 input power requirements.

Table 9-6. Input Power Requirements

Input Voltage and Frequency	100-240 ±10%; 50/60 Hz
Maximum Inrush Current	8 AMPs peak (for 1 power supply) 120 VAC or 16 AMPs peak (for 2 power supplies) 16 AMPs peak (for 1 power supply) 240 VAC or 32 AMPs peak (for 2 power supplies)
Delayed Action Circuit Breaker Recommended	North America: a 20 A minimum delayed action circuit recommended for each 16 A power distribution unit (PDU) that is connected to an HP Server tc4100. Europe (single server in a rack): a 16 A minimum circuit with one IEC-MCB C-type breaker for each 16 Amp PDU. Europe (single server in a rack): a 16 A minimum circuit with one IEC-MCB D-type breaker for each 16 Amp PDU.

NOTE Some local codes allow 16-amp service for a 16-amp device. Consult a qualified electrician or local regulatory authority before beginning electrical site preparation.

Power Ratings

Table 9-7 displays the HP Server tc4100 power ratings.

Table 9-7. Power Ratings

AC Input Voltages	Maximum Input Power (VA)	Maximum Input Power (W)	Maximum Operating Current RMS (AMPS)
100 VAC	650	643	6.5
120 VAC	640	628	5.3
208 VAC	625	605	3.0
230/240 VAC	630	603	2.6

Power Supply

Table 9-8 displays the HP Server tc4100 power requirements.

Table 9-8. Power Supply Recommended (Single Unit)

Input Type	Wide Range, PFC
Input Voltage and Frequency	100-127VAC±10%;50/60Hz 200-240VAC±10%;50/60Hz
Power Availability	425 W continuous
Maximum Cold Inrush Current per Power Cord	8 AMPs @ 120 VAC for <10ms 16 AMPs @ 240 VAC for <10ms

The power cord set found in your shipping box has been approved for use in the country where the Server was purchased. If any other power cord set is used, it must meet appropriate safety requirements in the country in which the Server is to be used.

Table 9-9. General Cord Set Requirements

Cord Set Approved or recognized by a safety agency in the country of use)	250 VAC, 10 A
	125 VAC, 10 A
Maximum Length	2.4 m (8 ft)

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